Public Utilities

FORTNIGHTLY

Volume L No. 3 July 31, 1952

TRANSISTOR ELECTRONIC AIDS TO COMMUNICATIONS
By Howard J. Carswell

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Have the Private Power Companies Any Future?
By J. E. Corette

« »

Interior's Adventures in the Missouri Basin Part II.
By Ray Tucker

« »

The Heat Pump Up to Date
By John P. Callahan

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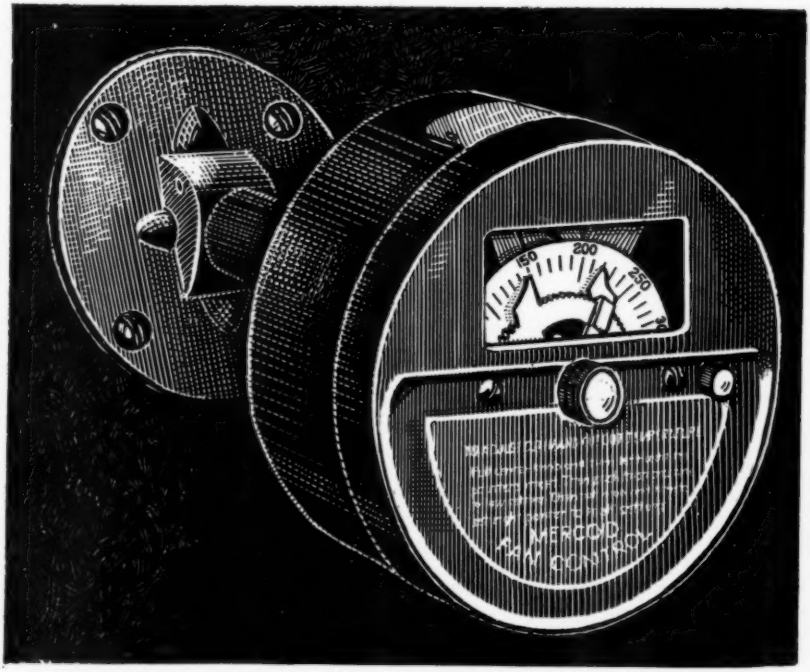

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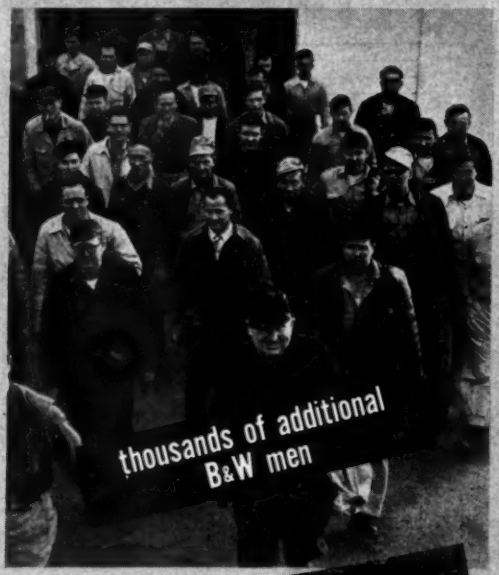

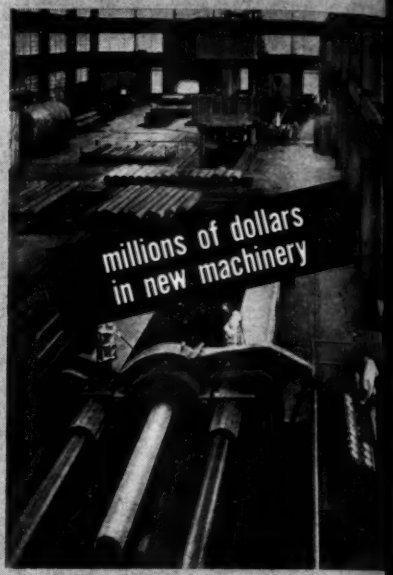

B&W EXPANDS FOR

MORE

Many new B&W boilers are under construction and on order to supply steam requirements for several million kilowatts of new generating capacity.

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POWER FOR AMERICA

Keeping pace with the electric companies' far-sighted expansion program, The Babcock & Wilcox Company is completing this year a multi-million-dollar increase in facilities for the manufacture of steam generating equipment.

Two new plants are already in production at Wilmington, N. C. and West Point, Miss. A third one is being built at Paris, Texas. Thousands of additional employees have been trained to man these new plants, and to work expanded fabricating facilities at five other B&W plants. New machines and processes . . . including the world's largest boiler plate press . . . are setting new standards of production efficiency and speed.

B&W's expansion program parallels the electric companies' long-range planning for new generating capacity and reflects B&W's confidence in the future of America's vital power industry.

BABCOCK & WILCOX

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Pages with the Editors

Now that the shouting and tumult of the political conventions are receding from our disturbed memories, we can look forward during the rest of the hot summer to a sizzling red political campaign. Republicans and Democrats, having practiced up on cutting each other's throats, appear to be in good form for the grand finale when the donkey tangles with the elephant.

Judging by the spirited applause given to the keynote orations, both sides are anxious for the preordained quadrennial Armageddon. People who were wondering, just two or three weeks ago, whether preconvention bitterness would ever be healed need worry no longer. It is in the best tradition of American politics that family squabbles are generally but warm-up contests for the main event.

And if some of the fanfare and pageantry of our antiquated convention system seems rather a high price to pay for the intermediate process of merely picking candidates, a moment's reflection should make it clear that even these excesses of infighting, are symptoms of an honestly democratic arena. If our political system was loaded, if everything were cut and dried, nobody would get very excited over the conventions at all. In fact, they would not get very excited over the election which would be a foregone conclusion.

J. E. CORETTE

Looking across the border to our good neighbor to the South, we could have seen such an election on Sunday, July 6th. Nobody was much surprised when Senor Ruiz Cortines was declared elected before even a comparative handful of the votes had been counted. Ever since the days of President Obregon, Mexico has had a *de facto* one-party system. This is not to say that the Mexican government is a dictatorship. There are other parties and they are permitted to function. But the dominance of the so-called Revolutionary party in Mexico has become so great as to constitute a virtual political monopoly. But what has happened in Mexico could conceivably happen in the United States.

The ultimate danger of a one-party system on a national scale (we have had a one-party system in the South for many years) is apparent. While opposition may be tolerated in the beginning, eventually, especially under pressure of emergency or economic crises, the temptation to suppress opposition increases. From that point to a position of totalitarianism is not such a far step. And so, we have reason to be thankful here in the United States that there is plenty of life in both the old parties. So much so that they feel they can afford the luxury of fighting among themselves.

Thanks to President Truman the electric utilities primarily, and perhaps other utilities by proximity, will find themselves very much in the election limelight if the Democrats have their way. Of course, the Democrats may not get their way, in view of General Eisenhower's determination to keep the campaign centered largely on other issues.

Have financial experts enough information to analyze your Company correctly?

• The decisions of financial analysts play a vital part in the investment community. Hence, almost all utility companies do a fine job of keeping analysts informed of their operations.

When furnishing such information, it is highly advisable to know exactly what is wanted and how to present it. And that's the purpose of the Irving's new series of *Public Utility Bulletins* . . . to help you in your constructive program of keeping the financial analyst informed.

For your copies of current and future Bulletins, write us or call our Public Utilities Department.

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Public Utilities Department
TOM P. WALKER, *Vice President in Charge*

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

PRESIDENT Roosevelt had a good deal of success with the so-called power issue. But in the light of many other national problems involving billions of dollars, undue emphasis on the rôle of electric power—important though it may be —may strike the voters as a little too obvious exercise in the "look-over-here" technique of stage magicians.

REGARDLESS of who wins the election in November, it is hard to imagine that the future of the electric power companies is going to be decided entirely as an accidental by-product of a single political campaign. Instead it is more reasonable to assume the future of the electric companies over the long range lies in their own hands. We have in this issue an article by a young official of a western utility company, which gives the reasons for believing that not only is there a future for the private power companies, but that it is something gloriously inevitable if the industry will keep its own faith with the American people.

THIS article (beginning on page 143) by J. E. CORETTE, now president as well as general manager of The Montana Power Company, is in substance the written version of an inspiring talk which MR. CORETTE gave before the twentieth annual convention of the Edison Electric Institute on June 4th. It was prepared in article form for the FORTNIGHTLY.

MR. CORETTE was born in Butte, Montana, in 1908; attended Butte high school and the Montana State University. He graduated from the University of Virginia (LLB, '30) and practiced law in Missoula, Montana, until 1934; but he has been associated with Montana Power Company since 1930. After practicing law in Butte with his own firm (1934 to 1944), MR. CORETTE became vice president and assistant general manager of The Montana Power Company in 1944 and director in 1948. It was just this month that he became president and general manager at forty-four years of age. He has been active in the affairs of the National Association of Electric Companies and with affiliated natural gas interests in the Montana area.

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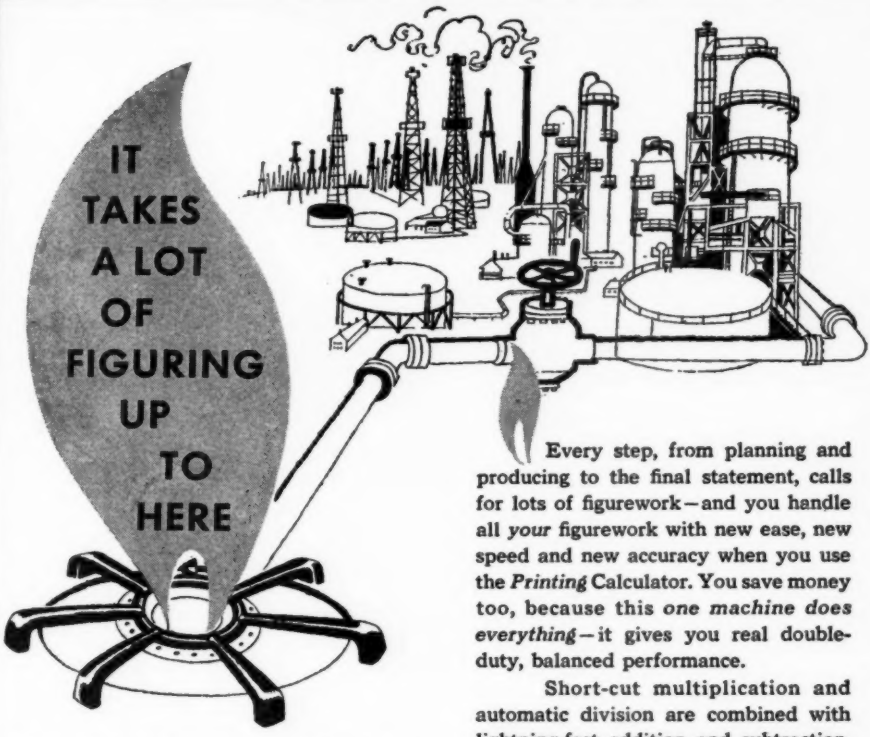
HOWARD J. CARSWELL

SPEAKING of the future, we have two articles in this issue dealing with important developments in the life of two great utility industries which are just around the corner. Both of these articles deal with new technical discoveries which are already in existence and have actually been tested for performance. But both are awaiting full-scale production and widespread industrial application.

THE article on the tiny transistor, the "miracle mite" of the communications business, which opens this issue, comes to us from HOWARD J. CARSWELL, now on the staff of the Guaranty Trust Company of New York. MR. CARSWELL first contributed to this magazine when he was a public relations executive of the Bituminous Coal Institute—a division of the National Coal Association of Washington, D. C. He is a native of Kansas and an engineering graduate of Purdue University. MR. CARSWELL has devoted some years to newspaper writing, including World War II service as an Army Major with *Yank*, the Army weekly.

THE next number of this magazine will be out August 14th.

The Editors



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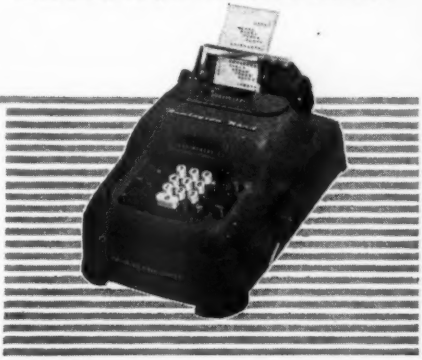

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Coming IN THE NEXT ISSUE

★

A REGULATORY VIEW OF UTILITY PENSIONS

Public utility companies were among the earliest business organizations to establish systematic pension plans covering all permanent employees. In recent years, however, experience and necessary adjustments have created regulatory problems. Proper treatment of pensions as operating expenses, past accruals of actuarial liability, and other questions of pension administration have come before regulatory agencies for consideration. The Honorable Spencer B. Eddy has written a valuable and interesting analysis of utility pension plans from the standpoint of the regulator.

INDUSTRIALIZATION AND THE CHEAP POWER MYTH

The emergence of the government as a force in the manufacture and sale of electric power has been an evolutionary process. In the beginning the government sold only the rights, then the power from Federal projects. More recently the government has gone in for distribution and supplementing its own hydro with its own steam plants. Dr. John S. Garwood, associate professor of economics, Fort Hays Kansas State College, shows how the principal "maximum advantage" eventually will result in complete nationalization of electric power.

FINDING UTILITY MONEY FOR NEW PEOPLE

The program of Pacific Telephone & Telegraph Company will undoubtedly be of interest to all utility men having the responsibility of planning. Migration to the coastal states has presented unusual problems. In this article, James H. Collins shows how this great telephone company is coping with the steady and rapid growth of plant facilities and the demand for more service.

THEY KEEP THEM HAPPY ON THE FARM

Utilities are not generally or directly responsible for erosion control or land conservation. Henry F. Unger, Washington free lance writer, has discovered that natural gas pipeline companies have had to go into the problem of soil stabilization to maintain their right of ways. Erosion, unchecked, can do more damage in terms of dollars to a pipeline and to the farms surrounding it. The solution helps the farmer even while it protects the utility investment.

★

Also . . . ***Special financial news, digests, and interpretations of court and commission decisions, general news happenings, reviews, Washington gossip, and other features of interest to public utility regulators, companies, executives, financial experts, employees, investors, and others.***

There's a faster way!

Going through a lot of motions and hand-waving today is not only exhausting, but mighty costly.

In utility offices . . .

We have in mind, specifically, the sensible method of compiling bill analyses.

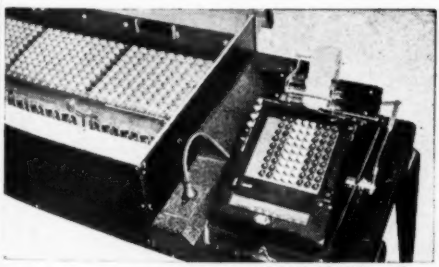
Instead of acquiring, training and supervising a large clerical force to analyze thousands of consumers' bills, many utilities all over the country simply turn over the job to us.

Our experienced staff, plus our specially designed Bill Frequency Analyzer machines, can turn out the job for you in a few days, and the cost is only a small fraction of a cent per item.

Let us tell you more in detail about this accurate and rapid method of obtaining a picture of your consumers' usage situation. Write today.

P.S. If you use punched cards for billing, we are also equipped to make your analyses from them.

SAVES 50% IN TIME AND MONEY



This Bill Frequency Analyzer—developed especially for utility usage data—automatically classifies and adds in 300 registers—in one step.

RECORDING AND STATISTICAL CORPORATION

100 Sixth Avenue New York 13, N. Y.

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Remarkable Remarks

"There never was in the world two opinions alike."
—MONTAIGNE

WILLIAM RANDOLPH HEARST
Late publisher.

"Respect for law is a good thing when the laws and lawmakers are worthy of respect."

CHARLES F. BRANNAN
Secretary of Agriculture.

"Let's don't get scared at the word subsidy—it is a part of the economic system of this country."

IRVING S. OLDS
Former chairman, United States Steel Corporation.

"Contempt for property rights has . . . become the controlling philosophy of those who seek to alter our American climate of freedom."

HERBERT HOOVER
Former President of the United States.

"In the last analysis, no law will substitute for ethical standards applied as a matter of course by individuals in their daily conduct of the public business."

D. A. HULCY
President, Lone Star Gas Company.

"The story of free enterprise, must be retold in ringing accents—and told over and over again until it's second nature to rebel against proposals to amend it."

A. L. KIRKPATRICK
Manager, insurance department, Chamber of Commerce of the United States.

". . . Federal agencies, notably the Interior Department, are more interested in the development and control of hydroelectric power than in flood control. These Federal planners are more to blame than anyone else for the flood toll of recent years."

BEN MOREELL
Chairman of the board, Jones & Laughlin Steel Corporation.

"The challenge to American business, is clear and all important to the future of our country. Can we assume a conscious and vigorous leadership based upon the highest principles which should govern human relations? Unless we can, and do, assume this leadership, it will be taken over by those who will take us down the road to complete statism and inevitable collapse."

DR. FRED J. EMMERICH
President, Allied Chemical & Dye Corporation.

"The achievement of science, as demonstrated by the results of chemical, medical, and industrial research, lead to the expectation of future progress unthought of today. Man will have the means of happy and full living, or he will have the means of virtually complete self-destruction. The choice which the world will make between these alternatives lies in human relations. And here again science has given us the means by which to influence the choice."

How you can use RM-ASA Power Transformers where "specials" seem to be required

. . . and get several months faster shipment and up to 8% lower price

Many power transformer applications require voltages, impedances, and tap arrangements which apparently can be provided only by non-standard transformers. Often, you can meet these requirements with G-E RM (Repetitive Manufacture) transformers which conform to the new ASA standards. At the same time, you obtain attractive savings in both time and money. For example, with RM-ASA Transformers . . .

YOU CAN OPERATE AT NON-STANDARD VOLTAGE:
One optional feature of RM-ASA transformers provides that the high-voltage rating for each insulation class above 5 kv can be varied over a 20% range. This means, also, that by under-exciting you can obtain secondary voltages other than EEI-NEMA Preferred Voltage ratings. There may be some sacrifice in rating, of course—but you will get more kva per dollar than with a special transformer.

Example: You have a standard 34.5-kv primary, but want a non-standard low voltage of 2300. Select an optional RM-ASA rating of 36 to 2.4 kv. Operate at 34.5 kv. You'll get your 2300 volts.

You pay 1% for the optional high voltage. You save 8% in base price. You get faster delivery.

YOU CAN GET ALL TAPS ABOVE OR BELOW THE ACTUAL PRIMARY VOLTAGE:
With RM-ASA transformers, you get two taps above and two below the rated primary voltage. By selecting an optional primary rating, you can get all four taps above (or all below) your actual line voltage.

Example: Your high voltage is 34.4 kv. You want all taps below this. By selecting 32.8 kv for the primary rating, you get taps at 34.4, 33.6, 32.0 and 31.2 kv.

You pay 1% for the optional voltage. You save 8% in base price. You get faster delivery.

YOU CAN PARALLEL TRANSFORMERS WITH DIFFERENT IMPEDANCE:
Impedances of RM-ASA transformers are fixed at 5.5% to 7.0%, depending on high voltage. While this affects division of load when an RM-ASA unit is paralleled with an existing transformer, it is not as critical as you might think. It seldom results in a serious loss of capacity.

Example: You want to parallel a 34.4-kv RM-ASA transformer (impedance, 6%) with an existing unit having an impedance of 6.6%. Theoretical division of load is about 52%—48%. Often actual division will be even better than this because of external impedances. At worst, you have lost less than 5% in capacity. You have saved 8% in cost, gotten faster delivery.

YOU CAN PARALLEL △-Y WITH Y-△
While in most ratings, RM-ASA transformers are available as △-Y or △-△, a △-Y RM-ASA transformer can almost always be paralleled with an existing Y-△ unit. In fact, there is one advantage: You can ground the high side through the old unit, the low side through the new RM-ASA unit.

YOU HAVE 20 OPTIONS AVAILABLE:
These include: optional primary voltages—load-ratio-control—bushing current transformers—fans or provisions for future fans—junction boxes, and many others. RM-ASA power transformers are available in ratings up to 5000 kva single-phase and 10,000 kva three-phase. The ratings cover all EEI-NEMA Preferred Voltages—high and low—69 kv and below.

Let us help you apply RM-ASA transformers. For additional information, contact your nearest G-E representative. ***General Electric Company, Schenectady, N. Y.*** 401-33E

GENERAL ELECTRIC

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JOSEPH W. MARTIN, JR.
U. S. Representative from Massachusetts.

"Much of our confusion in government arises from the steady encroachment of the government in our personal lives and our business objectives."

GORDON DEAN
Chairman, Atomic Energy Commission.

"Atomic energy will tend to supplement, rather than to supplant, our traditional sources of fuel supply, for at least as long as the traditional fuels are available at relatively low cost."

ELLIOT V. BELL
Editor, Business Week.

"Long-range inflation is part of the problem that freedom-loving countries have to surmount if they are going to preserve their freedom in the face of the threat of world-wide Communism."

IRVING M. IVES
U. S. Senator from New York.

"The precept that government is all-knowing—the fixation that a group of bureaucrats should decide what is best for the people—is foreign to our very traditions. It is the harbinger of the socialist state in America."

W. ALTON JONES
President, Cities Service Company.

"We must write over and over again the old copybook maxims. Honesty is the best policy. There is no substitute for work. Folly brings its own penalty. Right living brings its own reward. The market place is mightier than any legislative hall."

JOHN W. BECK
Financial editor, Daily Oklahoman.

"For centuries the advance of man has been hampered, and in some instances hog-tied, by do-gooders and demagogues who sought, through ignorance or design, to obstruct the ways of free men and free markets with monetary and physical controls."

HINES H. BAKER
President, Humble Oil & Refining Company.

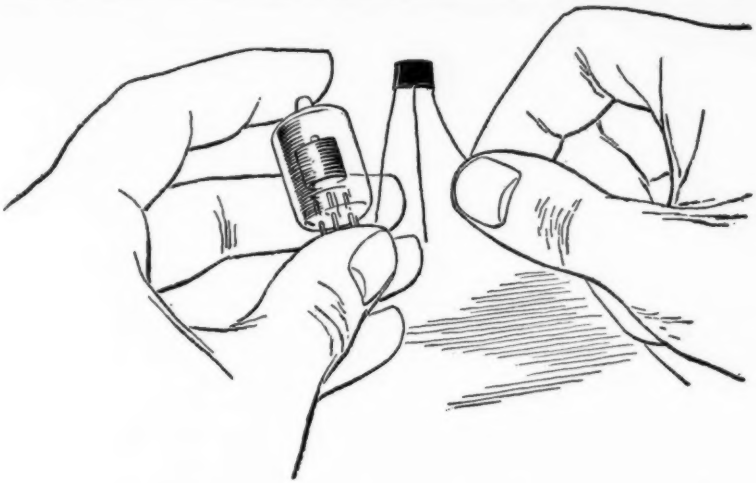
"Continued exercise of emergency powers, involving wage and price controls, allocation of material, and tremendous spending operate to expand the power of the Federal administration at the expense of the freedom of individuals and business enterprise."

T. M. GIRDLER
Chairman, Republic Steel Corporation.

"There are many legal prohibitions which prevent business from acting in unison on any issue. That is as it should be. But there is nothing that forbids an individual union closing down a complete industry or a group of unions striking against many industries at the same time."

EDITORIAL STATEMENT
The New York Times.

"The power to seize property is the power to destroy, to stifle opinion, to abolish freedom of the press, and a long step down the road to no freedoms at all. The history of our times, in other countries, is eloquent with example of the servitude to which peoples are delivered by such power."



New Triumph of Science!

The transistor, employing the semi-conducting element germanium, is a new tool which is joining the vacuum tube in the teamwork of electronic devices which serve so significantly in radio, telephony, television, computing machines, and in the trend toward making office and factory operations more efficient.

The germanium transistor exemplifies swift progress in the amazing science of electronics. New electronic uses are expanding the pervasive role of electricity throughout the entire fabric of industrial civilization. Banking keeps abreast of these ultramodern trends, because banking plays just as fundamental a role.

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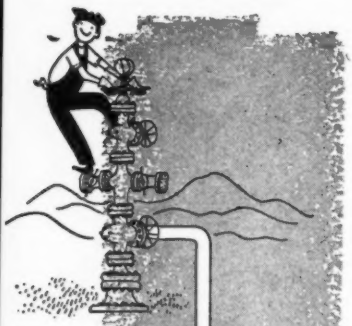

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The Keystone Gas Company, Inc.
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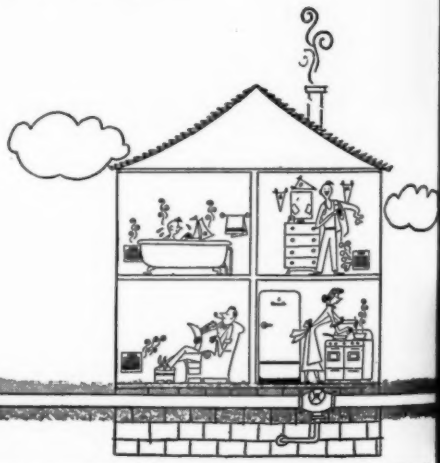
The Preston Oil Company



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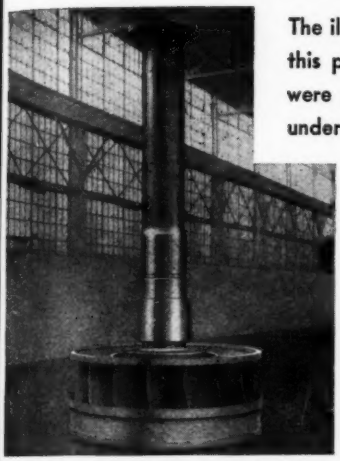
LEFFEL Hydraulic Turbines

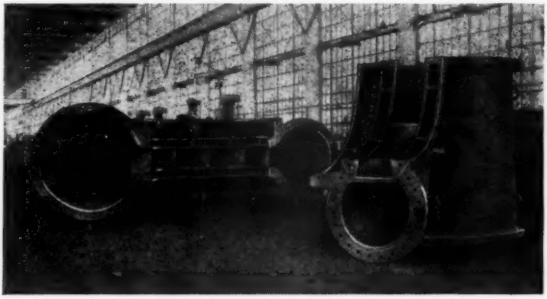
EFFICIENT • DEPENDABLE • SINCE 1862

Leffel Production Means Finer Performance . . .

The illustrations below show a typical Leffel production job. For this particular installation two identical Francis type turbines were produced. Each has a maximum rating of 28,250 h.p., under 324 ft. net head, speed 277 r.p.m.



Runner and shaft, assembled in the Leffel plant.



Sections of cast steel spiral casing on assembly floor.

Power-house with uncompleted spillway and earth-filled dam.

Completely assembled turbine unit.

Leffel turbines are designed and constructed to give maximum power at minimum cost. 90 years of experience have demonstrated that long life and reliability are assured in **every** Leffel hydraulic turbine.

FOUNDED IN 1862

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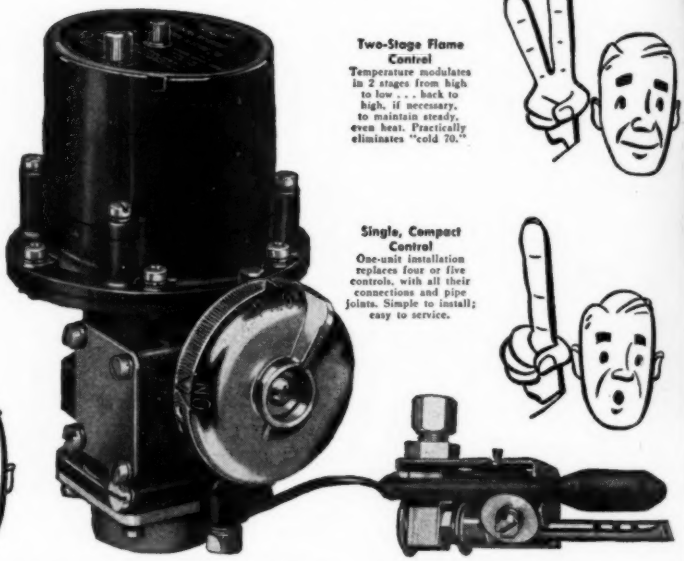

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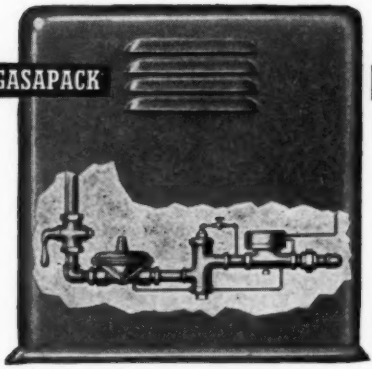

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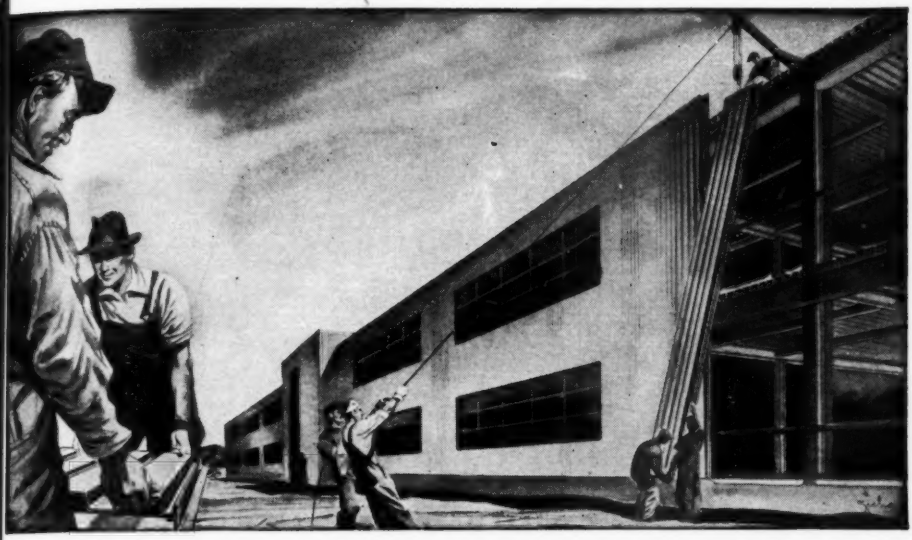
what we really make is time!



it's faster to hang a wall than to pile it up . . .

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We save days and weeks in finishing a building for *use*, because years have been put into the development of these unique skills.

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Q-Panel construction is quick, dry, clean, and offers an interesting medium of architectural expression.

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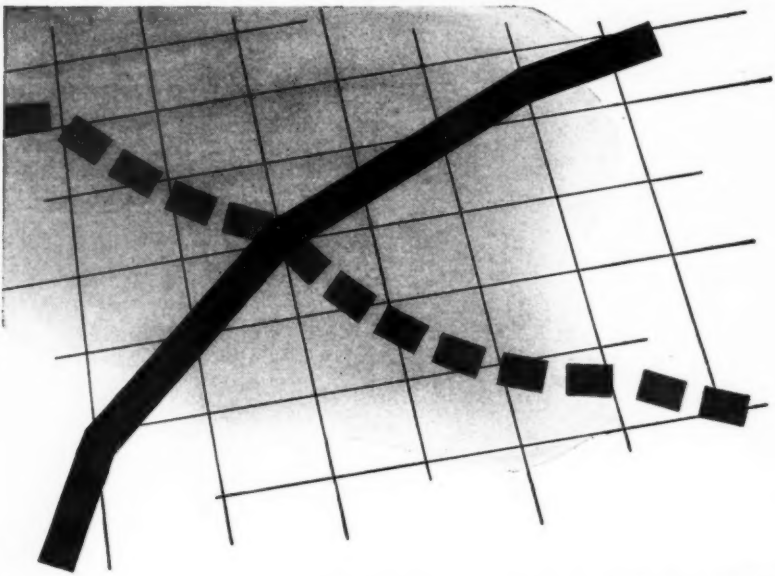

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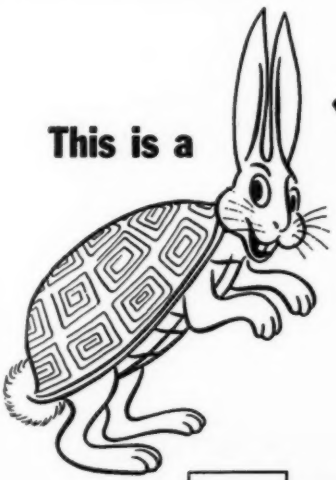

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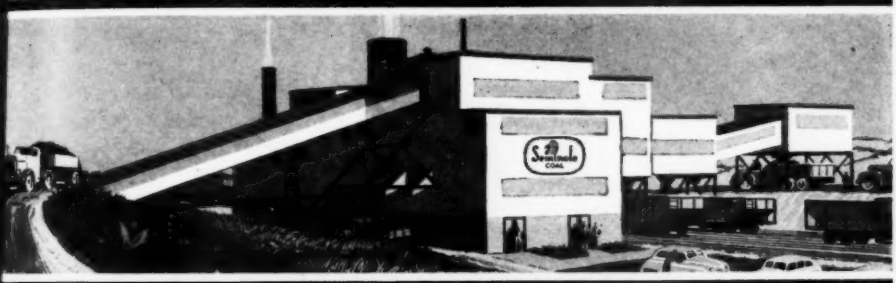
Famed for luxurious appointments, wonderful food and superlative service, this great hotel towers high above Chicago's skyline in the heart of the loop. It is the established hostelry of the country's leading organizations, and will be a popular gathering place for major political parties during the July conventions. Its continued popularity is due to efficient operation by sound and experienced management.



Southern's Seminole mine, Lenzburg, Illinois, on the I. C. Railroad. Typical of Southern's many modern operations.

SOUTHERN'S PRECISION PREPARED COAL HELPS LOWER THE MORRISON'S STEAM AND OPERATING COSTS

Precision engineered coal from Southern's Seminole mine—specifically applied to the Morrison's burning equipment, helps to maintain lower steam costs through more efficient burning performance and substantial fuel economies.

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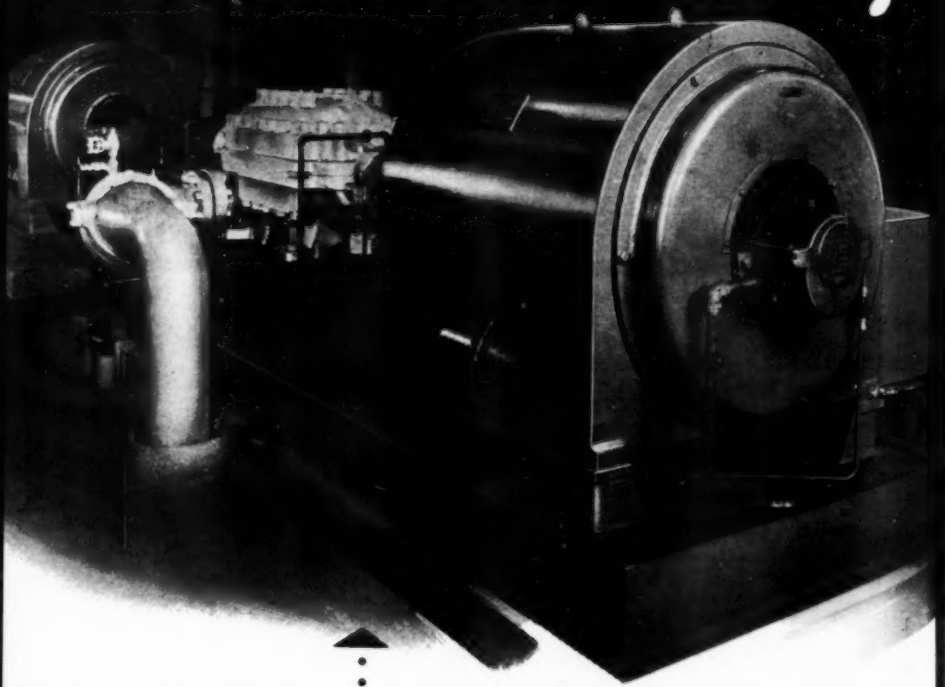

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22-21

Utilities Almanack

July

31	T[h]	¶ *American Institute of Electrical Engineers will hold Pacific general meeting, Phoenix, Ariz., Aug. 19-22, 1952.*

August

1	F	¶ *American Water Works Association, New York Section, will hold annual meeting, Upper Saranac Lake, N. Y., Sept. 3–5, 1952.*
2	S[a]	¶ *Pacific Coast Gas Association will hold meeting, Los Angeles, Cal., Sept. 3–5, 1952.*
3	S	¶ *National Surveying Teachers Conference will begin, Camp Blackduck, Minn., 1952.*
4	M	¶ *American Society of Civil Engineers will hold centennial celebration, Chicago, Ill., Sept. 3–13, 1952.*
5	T[u]	¶ *Maryland Utilities Association will hold annual meeting, Virginia Beach, Va., Sept. 5, 6, 1952.*
6	W	¶ *Wisconsin Utilities Association will hold management conference, Land O'Lakes, Wis., Sept. 7–9, 1952.*
7	T[h]	¶ *Rocky Mountain Electrical League will hold fall convention, Glenwood Springs, Colo., Sept. 7–10, 1952.*
8	F	¶ *American Standards Association will hold national standardization conference, Chicago, Ill., Sept. 8–10, 1952.*
9	S[a]	¶ *American Society of Mechanical Engineers will hold fall meeting, Chicago, Ill., Sept. 8–11, 1952.*
10	S	¶ *American Water Works Association, Minnesota Section, will hold annual meeting, Sioux Falls, S. D., Sept. 10–12, 1952.*
11	M	¶ *New England Gas Association will hold appliance servicing conference, Boston, Mass., Sept. 11, 1952.*
12	T[u]	¶ *Mid-West Gas Association will hold gas school and conference, Ames, Iowa, Sept. 11, 12, 1952.*
13	W	¶ *Arkansas Telephone Association will hold annual convention, Hot Springs, Ark., Sept. 15, 16, 1952.*

Courtesy, Pacific Telephone & Telegraph Company

Remember This Last Winter?

Current heat waves bring memories of the snowbanks in Donner Pass where telephone linemen had to dig down to free crossarms on 35-foot poles.

Public Utilities
FORTNIGHTLY

VOL. L, No. 3 JULY 31, 1952

Transistor Electronic Aids To Communications

We will be using microwave, facsimile, and TV for transmission of business information, telemetering for reading gauges at long distances, electronic business machines, and memory devices for computers. The heart of such apparatus is likely to be the tiny transistor—the mighty miracle mite—pioneered by the Bell system and now the subject of many applications in the field of electronics.

By HOWARD J. CARSWELL*

THE electron tube which gave life and greatness to our amazing electronics industry is getting a new teammate and, for many uses, a rival. It is the transistor, employing germanium, a metal-like element which thus far derives commercially as a zinc by-product. Like the atom bomb, the transistor was planned in theory, its performance predicted by mathematical calculations, and its design put on paper before its creation. The swiftly advancing technology is implicit in the great, profound new knowledge of atomic science.

In proper perspective, consider the transistor as an important new member of a *team* of nonelectron tube components which promise new and significant things to come—new applications which seem remarkable to the lay observer. In the general picture

*For personal note, see "Pages with the Editors."

consider also the impressive achievements being made in "miniaturization," or reduction to smallness, of electron tubes and other components.

Emphasis here is on the transistor itself because it is new. Other members of the electronics team deserve mention of their importance; they include the diode, which a layman would comprehend as an electronic "valve" (two-electrode) for one-way conversion of AC to DC; the triode (three-electrode); the resistor, capacitor, and rectifier. Also the magnetic amplifier and the dielectric amplifier which seem to be coming into their own. The science is developing its own nomenclature.

THE new knowledge of the singular properties of the germanium atom for magnifying and regulating current gives renewed importance to researches involving other semiconductors. A semiconductor, as its name implies, has both metallic and nonmetallic properties in relation to electricity. It is between the good conductor, as copper, and the nonconductor, as glass or procelain. It is so resistant that it is an inefficient conductor in a conventional sense; yet it is not an insulator. Whatever the excited interest today in germanium, that phenomenal advance of electronics science may be expected to develop newer and perhaps better devices employing germanium and/or other semiconductors. These are silicon, selenium, tellurium, and boron in particular, some metallic oxides, sulphides, some intermetallic compounds, and titanates. Titanates are chemical salts based on the element, titanium.

Germanium came into its own during World War II when radar and other wartime demands gave electronics such surgent growth. The urge to perfect radar spurred the search for a substitute for the silicon diode in ultrahigh-frequency usage. Something less fragile was needed, and intensified pursuit resulted in the germanium diode, a one-way electronic "value" which proved good in low-frequency work. Diodes of germanium, selenium, and silicon, in particular, have figured impressively in radio, television, computers, telephony, military electronics, and other phases. In 1951 more than 4,500,000 germanium diodes were sold by the three largest commercial producers, with Western Electric Company considered as noncommercial because of its primary concern (except for the government) with production for Bell telephone purposes. Thus germanium's properties became established and known among the group of semiconductors for purposes of the transistor, diode, and the power rectifier.

THE transistor was invented in 1948 at the Bell Telephone Laboratories by Dr. John Bardeen and Dr. Walter H. Brattain working under a general research program directed by Dr. William Shockley. The Bell Telephone Laboratories have benevolently disseminated knowledge of it and made it available for licensing. If it lives up to its advance publicity, it is a great invention.

Elsewhere a shroud of secrecy, which customarily surrounds corporate researches, accounts for a paucity of announced or published news of who is doing precisely what. Another and better reason is that new

weapons and military uses are secret or confidential, and suffice it to say that the military authorities have evinced an acute and dominant interest in getting germanium transistors. Therefore specific mentions are not for invidious comparisons.

General Electric Company is a leader in the transistor and germanium rectifier development, and has been producing some transistors for three years. It is expanding production for military and commercial uses. Sylvania Electric Products, Inc., has transistor patents and has furnished transistors to the government. Raytheon Manufacturing Company has been supplying point-contact germanium transistors on a commercial basis since 1949, and has been a large producer of the germanium diode. Philco Corporation has been co-operating with the government on transistors for military uses, and plans for large-scale prouction for civilian and military electronics, Radio Corporation of America announced its "improved version" of a germanium transistor as indicative of its ambitions, and Westinghouse Electric Corporation presumably is evincing a similar concern.

Most of those in the business of manufacturing electron tubes, rectifiers based on copper oxide and selenium, and most resistor producers figure in the trend. Among those reported to figure in the outlook are the Hughes Research & Development Laboratories, Kemtron Electron Products Company, Radio Receptor Company, Inc., Philips Laboratories, Tung-Sol Electric, Inc., and the new subsidiary of Purolator Products, Inc., which is named Transistor Products, Inc. Germanium Corporation, a subsidiary of Radio Development & Research Corporation, is presently a commercial producer of junction transistors. Probably there are others.

Now we are into the story. The transistor is an amazingly simple device, capable of performing most of the functions of the ordinary vacuum tube. It looks like a metal "bug." It has most of the advantages, and few of the disadvantages, of the tube. It will do some jobs the tube will not do. The transistor serves as an amplifier or an oscillator; yet it is completely different from the electron tube and applies new physical principles. It has no glass envelope; has no vacuum; has no grid, and no cathode. Therefore there is no delay for warm-up, and having no filament it does not burn out. Barring abusive treatment, its life span is indefinite. It has no moving parts. Maintenance is negligible. It is relatively tiny, rugged, and *reliable*. Its power consumption is negligible, in a practical sense, using as little as 1/10,000 the power required by a vacuum tube.

❦

¶ "Like *the atom bomb, the transistor was planned in theory, its performance predicted by mathematical calculations, and its design put on paper before its creation. The swiftly advancing technology is implicit in the great, profound new knowledge of atomic science.*"

Already the transistor has three variants. Ultimately there may be different types of transistors for different uses just as there are different types of electron tubes and relay switches designed for many different specific operating conditions.

The initial invention was the *two-point contact* transistor, contained in a small metal cylinder the size of a 22-caliber bullet and having two "cat whiskers" of wires pressing against a pellet of germanium. It is confined to small powers. Input power is magnified on the order of one-hundred-fold.

Next came the *photoelectric* transistor. Both will figure vitally in the nation-wide subscriber toll dialing system for long-distance telephony which the Bell system is embarked upon. The photoelectric transistor has a key rôle in the "translator" which is, in effect, an automatic directory for picking out, by the punched card principle, the routing of the call from subscriber to the called station. Last autumn the pioneer installation of customer toll dialing was made in Englewood, New Jersey, from which locale the telephone caller may dial directly to the person being called in any of 18 areas between the Atlantic seaboard and San Francisco on the Pacific. The initial setup is one way, but the plan is for two-way subscriber toll dialing for long-distance telephony.

BEFORE many years a large number of electromechanical functions in telephony, as routing, selecting, switching, memory circuits, and such, may be done by transistor electronics.

The newest type is the *junction* transistor, having been announced in midyear 1951. Physicists call this the N-P-N (or P-N-P) as indicative that the positively (or negatively) charged portion is sandwiched between two ends oppositely charged. It is even more compact and tiny, and has three lead wires. It is being perfected in laboratory incubation. The point-contact variant can also be made in the form of a bead about the same size as the junction.

THE junction transistor occupies 1/400 of a cubic inch, by contrast with the volume of the smallest tube of about one-eighth cubic inch. A two-stage amplifier using this new transistor is smaller than a penny match box. Power handling capacity may be high. It is limited, however, to temperatures under 175°F. The junction transistor should find widespread applications in transmission types of circuits, such as telephone repeaters, hearing aids, portable radio receivers, etc. It is not as good at higher frequencies, and at present it does not fit as well into the electronic computer applications. However, it can operate on one-millionth of a watt, and it is capable of amplifying 100,000 times. High efficiency at very low voltages is its predominant characteristic.

The germanium power rectifier is a related development. It changes AC into DC and its power handling capacity is high. Therefore it opens up new fields to conquer in the regulation of large flows of current. A rectifier only five cubic inches in size can be made to control valve-like the flow of a thousand amperes or so, whereas the point-contact transistor is confined to small currents measurable in milliamperes, as the home radio, television

Birth of the Transistor

"THE transistor was invented in 1948 at the Bell Telephone Laboratories by Dr. John Bardeen and Dr. Walter H. Brattain working under a general research program directed by Dr. William Shockley. The Bell Telephone Laboratories have benevolently disseminated knowledge of it and made it available for licensing. If it lives up to its advance publicity, it is a great invention."

receiver, and computer component.

MILITARY electronics are an immediate, urgent field of usefulness for transistors and companion devices in this swift moving technology. Winston Churchill called this the "wizard" war of radar, radio, guided missiles, automatic fire control, proximity fuse, etc. The Navy's new "push-button" master communications console for instantaneously flashing battle information between warships is an example in which vital information is funneled from radar, radio, television, and new secret types of electronic equipment. The information is assembled, analyzed, and dispatched instantly.

The development of new and more destructive weapons and instruments of warfare may be expected to create new and surprising civilian uses. Possible now are the two-way walkie-talkie radio sets small as a wrist watch, and portable televison "walkie-lookie" stations with camera and transmitter which a man can carry like a shoulder pack. The tiny, reliable gimmicks will prove a real boon to human hearing aids. A great potentiality is in radio, television, the general field of instrumentation, and automaticity of factory and office operations.

Business machines and the category of key punch equipment offer a large possibility for further use of the teamwork of the new electronic devices, including transistors. These are the complex machines which calculate, tabulate, assort, collate, and interpret information whose range of usefulness is from large-scale scientific and engineering calculation down to conventional bookkeeping.

Spectacular in this field is the electronic digital computer. The tiny, reliable transistor can multiply, perhaps

as much as a hundredfold, the "brain" capacity of these elaborate machines. The complexity of these has been limited by the vacuum tube's life, reliability, heat, and size. Tubes take time to warm up. Because they burn out, maintenance and repair costs are high.

The machines are elaborately cumbersome as to size, space, and air conditioning for dissipation of heat.

A COMPACT, *reliable,* rugged, long-lived, and efficient transistor will mean better computing machines occupying far less bulk. For example, the Eniac computer contains 18,000 electron tubes, and its operation is impaired by the incessant replacement of burned-out tubes and the problem of heat dissipation. The IBM Selective Sequence Electronic Calculator has thousands of tubes. It is conceivable that what are today "giant" digital computing machines may be brought down in size and reliability for usage in everyday business and industrial problems, just as the desk calculating machine is used. High capacity computing machines for purposes of military logistics and planning may some day be applied to the ordinary business problems of market analysis, product mix, inventory control, and economic forecasting, and likewise for collating technical and scientific information involved in management decisions. The electronic computer of Boeing Airplane Company is useful for calculations far beyond aircraft and guided missile problems for which it was designed. On display at the aeronautic meeting of the Society of Automotive Engineers, it showed how to calculate the bounce, for example, in an auto spring before the auto is even built.

Now read the opinion of Dr. W. R. G. Baker, vice president and general manager, electronics division of the General Electric Company:

> . . . we have many of the bits and pieces that can make up an integrated electronic business system. We have closed circuit industrial television, microwave, and facsimile for transmission of business information, electronic memory devices and computers, telemetering for reading gauges at long distances, electronic business machines.
>
> A broad application would be a complete nation-wide order service and warehouse inventory with all paper work performed automatically by electronic business machines and with business information relayed from point to point by coaxial cable or microwave.
>
> Another would be an electronic method of reading household watt-hour meters, transmitting that information automatically to electronic business machines which would make out bills and compile a complete and continuous record. Such applications, although costly, become feasible as industry and commerce seek methods of cutting the real cost of services, as well as goods.

EVEN weather forecasting figures. A big electronic "brain" is now being tried at the Institute for Advanced Study at Princeton University for predicting the weather. In the "numerical forecasting" the electronic computer receives numerous facts describing the current flow pattern of prevailing weather, and by mathematical formulas the machine gives a prediction of what the weather will be an hour in advance.

Air-conditioning units to operate

electronically, temperature control and fire detection instruments offer an inviting prospect.

For factory and industrial purposes the germanium transistor and companion devices, as the germanium rectifier, offer interesting possibilities. *Automaticity* is a goal for better productive efficiency, labor saving, and quality control. This involves not only the instrumentation of processes now in effect but a redesign of processes to take advantage of instrumentation made possible by electronics. The machine tool industry is preparing new models which will incorporate automatic controls. Automatic materials handling equipment may be made which can bring a product to the machine and position it for machining. Continuous process engineering, as practiced by the oil and chemical industries, figures greatly in this trend toward more automaticity in which electronic devices do "thinking" and regulating.

Consider an example of a machine shop or a moving assembly line. These tiny germanium devices are rugged and resistant to vibration and shock, and by their nature their action is instantaneous, accurate, and reliable in the valve-like control of the start, stop, and flow of current. The germanium rectifier will convert the incoming AC into DC for driving the DC motor powering the turret lathe or conveyor belt. Automatically along with transistors it regulates the motor's speed, start, and stop. The electron tube could be made to do this, but it is less rugged against the hazards of vibration and shock.

THE modern high-speed printing press, as another example, requires precision of speed control over constituent rollers so that registration of color printing can be exact. The same is true of textile printing. An oil refinery should have quick, accurate, and dependable controls of the kind which electronic devices can exercise. In the pipeline transportation of oil and natural gas a faulty regulation of flow can be costly. Here transistor electronics can provide quick, decisive regulation of pressure and velocity, or shutoff.

Don't expect this outlined "electronicization" to come about too soon. From a practical viewpoint, the adoption of transistor electronics into the home radio and home TV is expected to follow such developments as military electronics, telephony, digital computers, etc. Although some tubes in the TV receiver may be displaced, the picture magnification will continue to be done by the vacuum tube. This alone is a big tube market, and consider also that electron tubes will serve for some purposes where the germanium devices will not.

Because their power usage is so small, will transistor electronics affect

¶ "THE *transistor is an amazingly simple device, capable of performing most of the functions of the ordinary vacuum tube. It looks like a metal 'bug.' It has most of the advantages, and few of the disavantages, of the tube. It will do some jobs the tube will not do.*"

electricity consumption? Certainly not, except to augment it over the long term. By expanding the entire concept of interior illumination the fluorescent lamp has been a boon to electric lighting even though it consumes less current per specific use. Likewise, the new solid-state electronic devices of germanium and other semiconductors will use less power per specific use, but they may be expected to proliferate the usefulness of electronics in factory, office, and home.

PERHAPS too much publicity attends the germanium transistor because it is new and exciting. It has its shortcomings and problems, and technological changes require much time to transpire. A very important consideration is that their coming involves new concepts of circuity and system design. The technique for achieving the ultrarefinement of germanium is a problem which will require patience. According to R. M. Burns, chemical co-ordinator of the Bell Telephone Laboratories, the transistor's essential characteristics "depend upon the controlled presence in germanium of certain alien atoms in the range of a *few atoms per hundred million* atoms of germanium—a neat job for the chemist."

A neat job, indeed! Some germanium transistors undergo inexplicable changes with temperature and time, and their performance has limitations with respect to noise. Much progress is reported with respect to designability. In general, it will take time and patience for developing the technique for producing in quantity on the required basis of quality and uniformity of performance.

It is re-emphasized that the transistor, however promising, should be considered as a skillful new member in the electronic teamwork of the diode, triode, rectifier, capacitor, resistor, etc., *along with the vacuum and gas-filled tube.*

Forty-five years ago Lee De Forest patented a "device for amplifying feeble electrical currents," a three-element audion tube. It made possible transoceanic and transcontinental telephony. Radio became a great new industry during the 1920's, and talking pictures revolutionized the movies. Diathermy was made possible. Wartime radar gave the industry a big boost. In the last five years television has been a marvel of growth.

THE electronics industry grew from $250,000,000 in annual sales in 1939 to an industry having $4 billion in sales in 1951, during which some 400,000,000 electron tubes worth $430,000,000 were made. It looks today as if the electronics industry is on the threshold of a great new expanse featuring new elements.

The industrial revolution started when the machine, especially the steam engine, began displacing the muscular work of man and beast, and the forces of wind and falling water. The initial phase was *mechanization.* Electricity came to pervade the entire fabric of industrial civilization, which second phase may be called *electromechanization.* The next phase could be the "electronicization" of electromechanization in which "brain-work" functions become electrified.

Have the Private Power Companies Any Future?

Here is the message of a top-flight utility executive who recently told the assembled members of the Edison Electric Institute that there is good reason for hope and faith in the future of the industry under its traditional business-managed system of company ownership.

By J. E. CORETTE*
PRESIDENT, THE MONTANA POWER COMPANY

THE ideas presented in this article are those of a utility man who engages in business in a state which now has, and for many years has had, the issue of Federal power dams and transmission lines.

Inasmuch as the power policies of the Interior Department are reasonably uniform throughout the nation, so that experience in one area where Federal projects exist and are under construction should be indicative of what to expect in other parts of the country, I should like to outline the situation today as it appears to me in regard to Federal power and private power companies, and the outlook for the future.

The program of the Interior Department has been stated many times by high officials and is completely understandable. I think there is general agreement within the electric power industry that this plan, if carried out, eventually would lead to nationalization, not only of the utility industry but of most other industries.

In the first part of this article, I shall endeavor to show just how far the Federal power program has progressed.

My outlook is that if the people of the nation continue to be alert, the Federal power program, as outlined by its authors, will not succeed.

CONGRESS definitely has not adopted and does not look kindly upon a Federal power program in which the Interior Department would take over the private power industry. I am very satisfied with the attitude evidenced by Congress when a utility is doing or is ready and willing to do the job.

*For additional personal note, see "Pages with the Editors."

I believe that the people do not look kindly upon any such Federal power program, and I am convinced that by continued presentations to the people of the facts involved we can and will stop and turn back such a program.

AFTER presenting the status of the Federal power program today, I shall endeavor to show why this program will not be carried to its ultimate conclusion and why our industry will continue to be the successful and prosperous one it is today.

By the end of June, 1952, the Federal government will have spent approximately $4,258,000,000 on projects involving power, exclusive of the $2.7 billion which has been appropriated for REA. The spending of this money has been concentrated in certain areas.

Chart I—Location of Spending on Federal Power Projects—shows in every area on the map that the Federal government has built or is building generating plants and transmission lines, and if the present program of the Interior Department is continued, the future of the companies in those areas is threatened. However, in practically every one of those areas, the private utility companies have been opposing with considerable success appropriations for the Federal power program.

ONE reason why the Federal power program has had such extensive development in a comparatively few years is that in the early stages and up until the last few years only a few companies were affected, the balance of the industry did not realize the danger, and the opposition to the program was extremely limited.

CHART 1

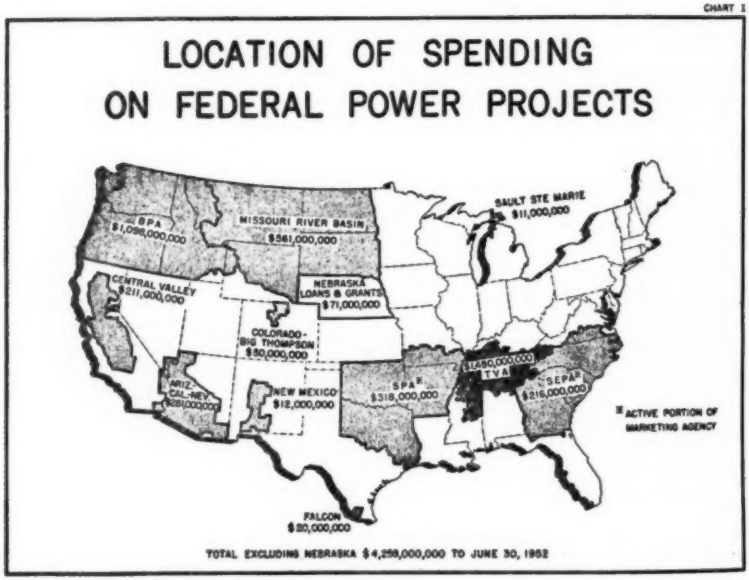


CHART II—Proportion of Electric Companies Directly Affected by Federal Power—shows that in 1931 one one per cent of the class A and B companies was directly affected by Federal power plants. Many uninformed and unaffected companies thought that the socialistic movement was local in character, was in some way due to the failure of the local companies to measure up to the situation, and in any event would never reach them. But, of course, it has moved forward and spread out.

By 1941, ten years later, the proportion had increased to 8 per cent and by 1951 to 27 per cent, including those that had been expropriated. And by "affected" I mean right up against the gun. A lot more are well aware of what is in store for them; others are beginning to be alarmed, while still others are going their various ways without paying too much attention to what is going to hit them in due time.

A comparison of the Federal projects which we now have and which are contemplated for the future is very interesting and shows the progress of the Federal power program up to the present time and what is planned for the future.

Chart III — Status of Federal Power Plant Program—shows that the Federal government has completed or has under construction 119 projects with approximately 16,672,000 kilowatts of installed capacity.

However, the government has authorized, approved, and proposed 649 plants with a capacity of almost 52,000,000 kilowatts.

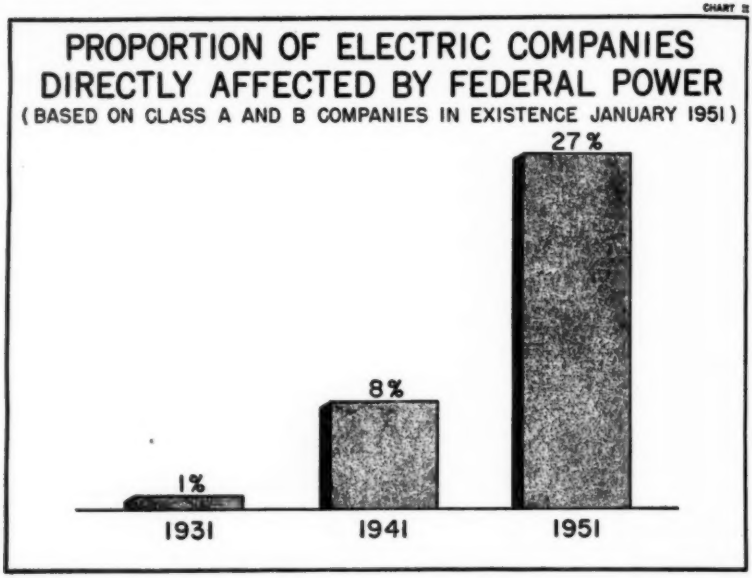
Fifteen and one-half per cent of the total plants have been completed or are under construction, but they constitute 24.5 per cent of the total kilowatts installed and to be installed. In other words, the plants which have been or are being constructed by the Federal government, in general, are much larger in capacity than the contemplated plants.

THE chart, including 768 projects, shows those projects which we have been able to identify. Undoubtedly, many more generating plants and transmission lines will be proposed as the years go by, including steam-electric stations not now formally in the program.

Just what this program would cost is anybody's guess. The Water Resources Policy Commission, in its recent report, gave figures ranging from $70 billion to $115 billion. Based on past experience, we can anticipate that the final figure would exceed these vast amounts if the program were to be carried to completion. These amounts indicate a tremendous burden on taxpayers, which is entirely unnecessary.

Chart IV—Disposition of Electricity Produced at Federal Dams—shows who gets the electricity produced at Federal dams and steam-electric stations. Including losses, nearly half goes to the so-called preference customers. The next largest group is certain especially favored major industries. The electric companies use only slightly more than 20 per cent of the total, although they serve 80 per cent of the people of the nation.

TVA can be considered as a good example of what we can expect in Federal power in the future unless the program is stopped.



TVA started as a means of disposing of the output from Wilson dam. It secured some steam plants in the course of its acquisition of utilities in the area, and built another steam plant during World War II under the guise of national defense. It built the New Johnsonville steam plant on the plea that it was responsible for the power supply in the area and now the lid is off.

In a few years TVA will be a steam-electric system with hydro for peaking purposes.

THE pattern of Federal power has become very plain. Because Congress has not looked with favor upon the establishment of additional valley authorities, Federal power marketing agencies are being set up by edict of the Secretary of the Interior, without the consent of Congress.

CHART V—Federal Power Marketing Areas—shows the five major power marketing agencies of the Federal government. Four of these—Southeastern Power Administration, Southwestern Power Administration, Bonneville Power Administration, and Bureau of Reclamation—are a part of the Department of the Interior.

TVA is an independent Federal corporation. The chart shows a sixth area—the state of Nebraska—where the enterprise has been financed in substantial part by the Federal government but is still on a state basis. There are also some other similar areas which are small and which I have not shown.

These major power marketing agencies are tax-free, subsidized utilities. They are the nationalized segment of the utility business.

We have learned by bitter experience that Federal dams which were authorized ostensibly for the purpose of irrigating our arid lands, or controlling floods, often turn out to be weapons designed to destroy the electric companies in the area and put the Federal government in the power business.

As example, the Federal government now operates or has under construction 15 steam-electric plants that have no other reason for existence than the generation of electricity; TVA has 9 hydroelectric plants that are strictly for power; other Federal hydroelectric plants—Hungry Horse, Canyon Ferry, and Clark Hill, to name three—originally were authorized as multipurpose projects with reclamation or flood-control benefits, but today are power plants and nothing more.

Many Department of Interior projects being urged at the present time are being sought without regard to purposes other than power, and the Interior Department itself frankly admits it is in the electric power business.

In the Roanoke Rapids Case, Secretary Chapman stated his position as follows: "The interest of the Secretary of the Interior is that of a *competitor* of Virginia Electric & Power Company in the sale of power in the Roanoke river area of Virginia and North Carolina."

The Southwestern and Southeastern Power administrations are engaging in another practice that is extremely dangerous and beyond the scope of the law under which they operate. They are purchasing steam-electric power for resale, although § 5 of the Flood Control Act of 1944 does not contain a single word giving them this authority. The Arkansas Circuit Court had this to say about the practice:

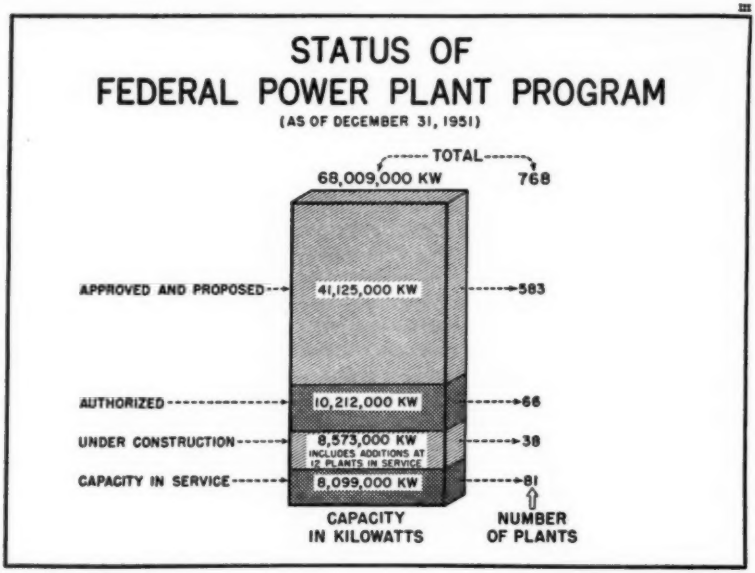
> . . . the national Congress, which prescribes the powers and duties of SWPA, only vests that agency with authority to sell and distribute hydroelectric energy produced by dual-purpose flood-control dams. It is not authorized to purchase energy produced by steam plants.

This brings us to the point of how I view the future of our truly great industry. It can be summarized as follows:

1. If the Interior Department policy continues as it is today, and if the thinking in Washington is such that the program is carried out as set forth in the Ickes memorandum of January 3, 1946, and in the testimony which the top Interior Department officials have given before Congress in each of the past several years, it will inevitably mean the nationalization of our industry and most other industries.

2. The plan is clear. It provides for Federal hydro plants, Federal steam plants, Federal transmission lines to all load centers, Federal control of all sales and rates. It is not regional—it will cover the entire nation and those who live in states not now involved had better do everything possible to help their buddies in the front-line trenches and to build their own defenses.

My best judgment is that this program will never be consummated; that the Federal policy will change.


STATUS OF
FEDERAL POWER PLANT PROGRAM
(AS OF DECEMBER 31, 1951)
TOTAL
68,009,000 KW
768
APPROVED AND PROPOSED
41,125,000 KW
583
AUTHORIZED
10,212,000 KW
66
UNDER CONSTRUCTION
8,573,000 KW
INCLUDES ADDITIONS AT 12 PLANTS IN SERVICE
38
CAPACITY IN SERVICE
8,099,000 KW
81
CAPACITY IN KILOWATTS
NUMBER OF PLANTS

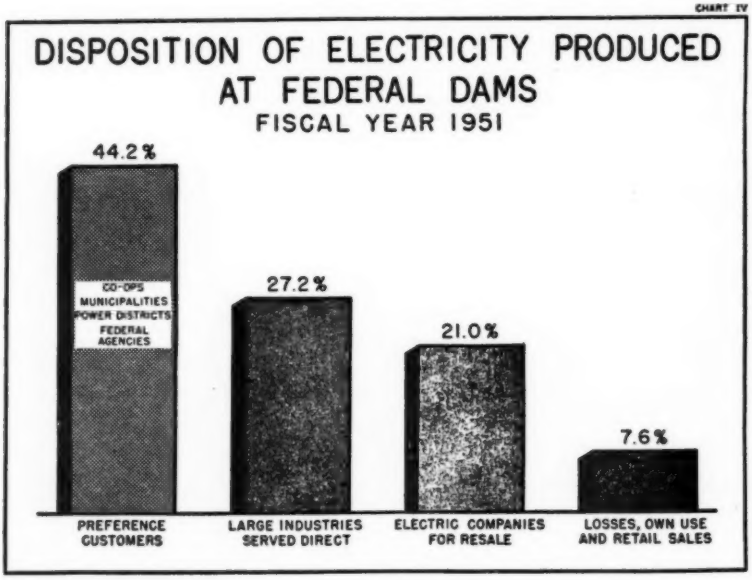


CHART IV
DISPOSITION OF ELECTRICITY PRODUCED AT FEDERAL DAMS
FISCAL YEAR 1951
44.2%
CO-OPS
MUNICIPALITIES
POWER DISTRICTS
FEDERAL AGENCIES
27.2%
21.0%
7.6%
PREFERENCE CUSTOMERS
LARGE INDUSTRIES SERVED DIRECT
ELECTRIC COMPANIES FOR RESALE
LOSSES, OWN USE AND RETAIL SALES

Although the foes of private utilities are so formidable that they could destroy the industry, intelligent activities by the industry can assure a long and successful future. Likewise, no activity, or limited activity, or unintelligent activity by the industry will lead to the eventual destruction of our companies by a tortuous process akin to a Russion trial and prison.

Please let me try to support this theory. Repeatedly we hear that a project is too large for private industry, so the government has to build it. That's just pure *baloney!*

TVA has spent about $540,000,000 on straight power facilities in the eighteen years it has been operating, since 1933. Compare this with the following record of construction by private companies—a record that has been achieved in the six years since the end of World War II: $816,000,000 by Pacific Gas and Electric Company; $445,000,000 by Consolidated Edison Company of New York; $344,000,000 by Southern California Edison Company; and $246,000,000 by Detroit Edison Company.

Between 1946 and 1952, the United States Steel Company spent almost $1.4 billion on its expansion program. From 1946 to 1951, inclusive, the electric utility industry spent $10,089,000,000 to construct new facilities, while in the same period the Federal government spent only about $2,428,000,000 on power projects—or only about one-quarter the amount financed by private enterprise.

THIS certainly indicates to me that the only thing our industry cannot build is a project which is not economically feasible, not financially sound, and which should not be built at all, or which should be built for some *valid* nonreimbursable reason, such as reclamation or flood control.

The war cry of the Federal power proponents is *"cheap power."* It has been effective against and harmful to the industry. Now let's analyze it. Whether the power is Federal power or private power, the people pay for it and every cent of it. They pay as consumers or as taxpayers, or both. Consider the Hungry Horse project in Montana.

CHART VI—The "Cheap Power" Myth in the Northwest — shows that Montana Power Company's Kerr dam cost $11,000,000 for 112,000 kilowatts of capacity. Hungry Horse, on the same watershed and only 50 miles away, is estimated to cost $110,000,000 for 285,000 kilowatts—10 times the money for 2½ times as much capacity. These figures are before any adjustment for differences in construction cost. Kerr dam's first unit was completed in 1938 and the second unit in 1949. Hungry Horse has been under construction since 1946.

Which is "cheap" power? We should do much more than we are doing to tell the people. Consider the number of employees per customer for each Federal agency. Then compare this with the number of employees per customer in any one company.

Also compare the cost per kilowatt of any project being built by the Federal government with the cost per kilowatt of the same type of project being built by private companies.

The socialized power program of the Federal government lacks a firm foundation of integrity and eco-

nomics. All the facts are on the side of the electric companies—I do not believe that we are taking full advantage of our favorable position. Whenever we do, we are surprisingly successful.

THE electric companies have been successful where they have opposed before Congress or the courts Federal hydroelectric projects which the companies were willing to build themselves—for example, Kings river in California and Roanoke Rapids in North Carolina.

The electric companies have been reasonably successful in opposing Federal transmission lines where they now have or are willing to build adequate lines themselves.

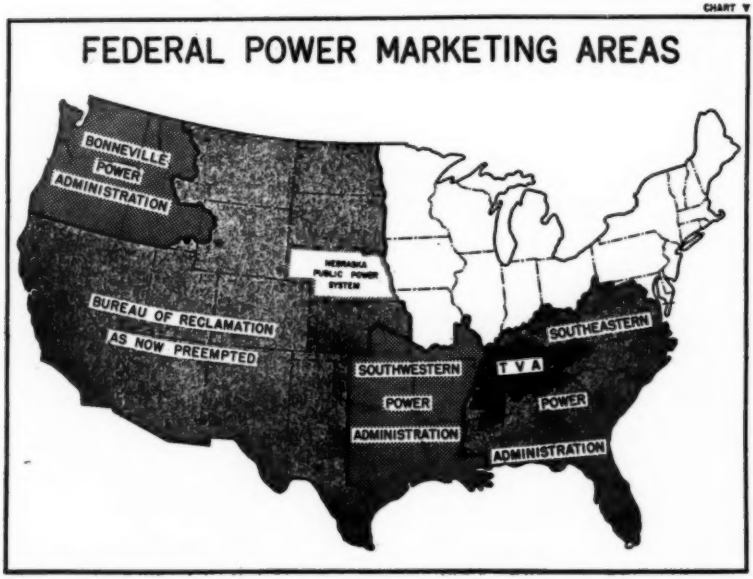
The five New York companies are making headway in preventing a Federal power development at Niagara by being willing and able to do the job themselves and by labeling the Federal proposal for what it is—an adventure in Socialism. New England companies are taking steps to forestall a Federal power invasion of their area by preparing to make the worth-while developments themselves.

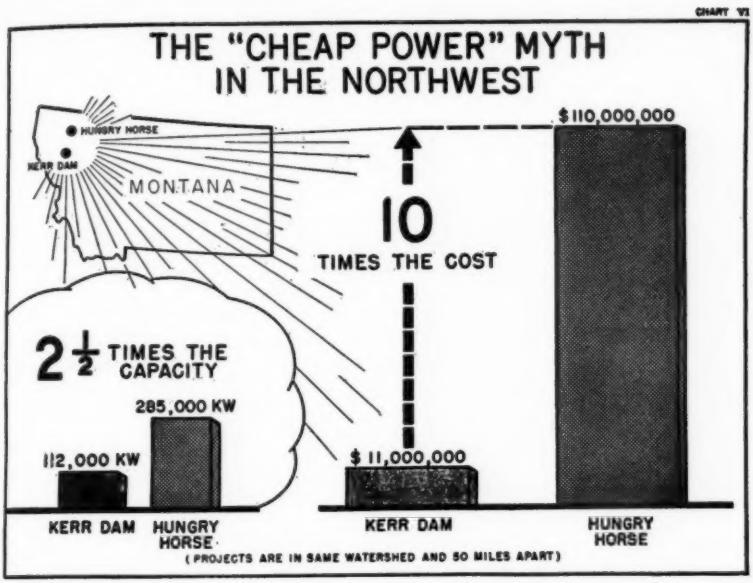
Electric Energy, Inc., successfully competed with TVA for a big share of a government defense load. Virginia Electric & Power Company is winning the Roanoke Case against the Department of the Interior.

We are beginning to organize as an industry and talk, act, think, and fight as a unit. We could well do much more than we are.

OUR real problem is much broader than a utility industry problem. If the utility problems could be isolated, the difficulties would be reduced to a

CHART V





fraction of their present importance.

As I see it, our entire nation is on a direct road to a lower standard of living, to fewer comforts in life, to reduced freedom, to something comparable to what England has today, unless the people demand a complete change in administrative thinking in Washington.

WASTEFUL, extravagant government necessarily means higher taxes, more inflation, more regulation by government, less actual value for your dollar, and that you will be able to buy less with what you receive for each hour you work.

For several years I have believed that the steel business, the banking business, the railroads, or the medical fraternity would be nationalized before the utility industry. However the order is not important, because if the nation adopts that policy all business will receive similar treatment.

If it is not too presumptuous, I would suggest the following program as one which should assure the continued success of our industry:

1. To maintain at all times adequate facilities — generation, transmission, and distribution—to supply the power requirements of a given area.

2. Efficient and courteous service to all members of the public, and at lowest possible cost.

3. A capable information department which keeps employees and the public informed on all problems relating to our industry and our form of government. Wasteful Federal spending, high taxes, the seizure of the steel industry, socialized medicine, are just as important as problems relating to our industry. It is all in the

same mulligan and all will be cooked together unless we put out the fire.

4. A willingness and readiness when economically feasible to build power projects on the streams of the nation, for example, Idaho Power Company at Hells Canyon and the power companies that are willing to develop the Niagara sites.

5. A willingness and readiness to build generating facilities and all other power facilities at Federal dams, whenever it is not economically feasible to also build the dam.

6. A willingness and readiness to build all necessary transmission lines.

7. An essential part of the last three points is an aggressive, active, forceful opposition to the government doing *any* of the things a private utility is willing to do.

8. Last—and this is very important—organization of the electric companies into a united front. We must make sure that the industry story is presented to the public adequately and correctly, and that we think, act, and speak as a team.

I CONCLUDE with four principal thoughts:

1. If the present administration can and does carry out its power program through future years, our industry is doomed and our personal futures and the futures of the people of America are dark and dreary.

2. Our fighting forces are far stronger than the opposition and if each utility company in these United States adopts and executes a sound intelligent program, our future and the future of the American people is bright.

3. Our future is so intermingled with the future of good government in these United States, with the future of all private ownership of property, with the future of personal freedoms, and with the future of the people as a whole that they cannot be separated.

4. And last—that we have before us one of the most important, most worth-while challenges ever confronting any industry and any nation, with a continuing land of plenty, if we do our job as we should.

"DESPITE *the relative outstanding economic progress that has been made under Capitalism, planners in Great Britain as well as in our own country and elsewhere are impatient to cure economic ills and relieve poverty by means of government planning that has had a record of dismal failures over the centuries. Under government planning, there is always a yawning gap between promise and performance. As Professor John Jewkes of the University of Manchester, England, pointed out in his book 'Ordeal by Planning': '. . . until he gets into power the planner complains that labor is sweated and the consumer undersupplied; after he gets into power he engages in constant exhortation for harder work and calls for an almost oriental patience from the impoverished consumer.'*"

—EXCERPT *from the New England Letter, published by The First National Bank of Boston.*

Interior's Adventures in the Missouri Basin

Part II. Interior's Plan for the Missouri

In this concluding instalment, Mr. Tucker specifically reviews a recent reconnaissance report by the Interior Department on its own plans for putting the Missouri river to work, damming its floods, developing its hydroelectric power, utilizing its waters for irrigation, and so forth.

By RAY TUCKER

The Missouri river basin was selected by the apostles of eventual nationalization of power as a test laboratory for specific reasons. In their opinion, it is the area most favorable for a start toward the integrated development which they have in mind for this and fourteen other valleys under the so-called Cooke-Warne program. It is, in effect, their self-chosen model for the propagation of their socialistic ideas and, secondly, for ultimate destruction, duplication, or absorption of the existing $25 billion private utility industry. As I said in the first article, it marks the transition from twenty years of guerrilla tactics to open warfare.

Settlement on the Missouri river basin as strategic battleground simply climaxes persistent and ingenious efforts, hitherto thwarted, to begin here an experiment in public ownership and operation. At first they proposed a Missouri Valley Authority similar to TVA, although they admit that there is no economic, topographical, or other resemblance between the two regions.

In a compromise with the Army Engineers, which entertains no great respect for ideological, bureaucratic planners, Interior agreed to the Pick-Sloan arrangement. Under this division of responsibility, Reclamation's activities were supposed to be limited to upstream conservation and flood-control works, while the military constructed downstream dams. Since this parceling of authority cramped In-

terior's elaborate schemes for an integrated, nation-wide power system, the federalists advanced the basin development idea, as originally outlined by Morris L. Cooke in February, 1951.

DRIVEN into a strategic retreat by the generally adverse reaction to the MVA and Cooke's 15-basin proposals, Interior finally concentrated on the Missouri river area as its most effective project for propaganda purposes. In a 2-inch-thick "reconnaissance" report larded with maps, charts, and statistics, which was prepared under the supervision of William E. Warne, former Assistant Secretary of Interior, and now, appropriately enough, Point Four Administrator in Iran, Interior revealed for the first time the slow but sure method by which it aims to supplant the private utilities in this and other sections.

Although President Truman has not openly approved the Cooke or Warne schemes, due to objections by the Budget Bureau, Congress, and local interests, he has shown sympathy toward their general objectives. Last February, one year after submission of the Cooke document, he named a new Missouri river basin survey group. This body, which is weighted by public power sympathizers, was instructed to report its findings and recommendations to the man in the White House within a year. It is probable that their suggestions, which will undoubtedly accord with the Cooke-Warne pattern in a general way, will furnish a major test of the next President's attitude toward the power issue, for it will be submitted only a month after his inauguration.

These numerous and diverse tactical maneuvers led Governor Val Peterson of Nebraska to remark that "President Truman, unable to get an MVA through the front door, is now trying it through the rear entrance." Other delays and controversies at Washington on this question were recalled by valley victims when last April's floods, the worse in recorded history, destroyed lives and property far exceeding the $1.5 billion already spent to prevent such disasters.

IT is also noteworthy, floodwise, that Interior has not discharged its responsibilities under the Pick-Sloan plan. It has not performed the upriver work designed to prevent the origin of flood conditions where the rain falls and the snow melts. Although some responsibility has been attributed to Congress for failure to provide sufficient funds for these projects, Capitol Hill's financial and legislative restrictions derived almost entirely from the legislators' discovery that Messrs. Chapman and Straus were more concerned with expanding the field of public power than in the constitutional, by-product activities resulting from hydroelectric development—flood control, irrigation, conservation, wildlife preservation, and recreation.

The underlying reason for Interior's slanted emphasis on its duties may be that there is neither power nor glory for "Fair Deal" ideologists, if they fulfill the functions delegated to them by Congress. Thus, the Missouri river basin project represents a last effort by Interior to escape or evade the legal restraints imposed by Congress and the courts. If ever sanctioned, it would be a *magna charta* for

an agency obsessed with power in both the literal and abstract sense, and death, slow or swift, for the electric utility industry.

Interior advertises the proposed Missouri scheme as its show-window exhibit. It was obviously inspired and patterned after TVA, despite official admission of basic incompatibilities, economic, geographic, and climatic, in the two valleys.

TVA, for example, is concentrated in a relatively small and homogeneous area, where the Tennessee river and its tributaries have a fairly constant flow, although steam-generated reinforcements have become more essential year by year. Situated near the populous markets for consumer and durable goods, the availability of power has attracted many great and diverse industries. Transportation facilities are handy and plentiful, and labor is not too expensive. The distances for transmission of power present no great difficulties. Finally, the farm lands flooded out by huge reservoirs, save for a few instances, were not a very important part of the nation's agricultural economy.

Not a single one of these propitious elements, as analysis of official reports show, occurs in the Missouri river basin. This area consists of 530,000 square miles, almost a subcontinent, extending from the Rockies to the Mississippi river and from the Canadian border to the Louisiana-Oklahoma-Texas lines. It is a region of polar extremes in geography, climate, agriculture, industry, and economic conditions.

Save for a few streams on the eastern slopes of the Rockies, which are far from prospective, profitable, populous markets for power or other commodities, its rivers boil over only in the spring and simmer sluggishly for ten months of the year. Its hydroelectric sources are so irregular, so undependable, and so sporadic that transmission of firm power throughout the vast spaces would be impractical from an economic and engineering standpoint. Its sources of vaguely potential wealth—industrial, agricultural, mineral—do not need and would not benefit greatly from new and costly power facilities built at the expense of taxpayers living in remote sections of the country.

The Warne report itself, when analyzed carefully, is the authority for these statements. In its opening pages, there appear many frankly deprecatory qualifications, to wit:

> The largest amounts of existing and potential hydroelectric power lie along the eastern slope of the Rocky Mountains and the upper mainstem of the Missouri river. The areas having the greatest power requirements, on the other hand, are in the southern and eastern part of the basin. . . .

¶ "The *Missouri river basin was selected by the apostles of eventual nationalization of power as a test laboratory for specific reasons. In their opinion, it is the area most favorable for a start toward the integrated development which they have in mind for this and fourteen other valleys under the so-called Cooke-Warne program.*"

> Hydroelectric power will contribute to these requirements, but will need to be supplemented *substantially* with thermal-electric generation and importation of power.

MR. WARNE's understatement here trespasses on distortion. Although he concedes that hydroelectric resources must be reinforced "substantially" by steam plants and importations from outside the basin, he passes gingerly over the disparity of energy sources. His engineers' charts show that, by 1970, hydro will provide only 9,302,000,000 of the additional kilowatt hours estimated to be needed to meet new demands, whereas thermal-electric energy and "importations" will furnish 25,358,000,000, or 71 per cent of the total.

It is significant that this disparity has always existed because of the region's topographical peculiarities.

In view of this admitted lack of water power resources in the region, it is not surprising that the Warne report devotes most of its discussion under the heading of "power-producing resources" to petroleum and natural gas, to bituminous and subbituminous coal, to shale oil and lignite. On this all important question, the report fails to take cognizance of two negative factors. For one thing, the nation's normal and expanding consumption of petroleum and natural gas, together with the long-range defense program, will not permit their diversion for power generation. The other sources of fuel, as Bureau of Mines experts testify, are so far from the stage of low-cost production that their use for any commercial purpose is not feasible.

"There are, however," the dream document adds, "other sources of power which *research may bring into the realm of practicability.* The more important of these in the basin are wind power and atomic energy. Another possible source of power is the use of direct solar energy."

Basin residents and property owners, who suffer now from sharp, seasonal fluctuations of a surplus or shortage of sun, rain, snow, and wind, may be pardoned for their formal petitions and protests against even more hazardous dependency on and subjugation to the visionary harnessing of these ungovernable elements.

TWO other suggested power sources lead responsible engineers to lift their eyes from their more practical blueprints. The report emphasizes that the important and sure supplies of energy consist of water power from Montana, Wyoming, and Colorado on the western rim of the basin, and commercial coal from Illinois, Kentucky, West Virginia. It is from these two areas, both of which lie outside the basin proper, that "importations" would come. But the distance between the two power-producing rims is 800 miles, which would make transmission to the interior of the region highly impractical from an economic and engineering standpoint.

These factual citations from the Warne report make it appallingly evident that the proposed development is not a "water power" program, although it has been advanced and advertised as nothing more than an extension of Truman-Chapman-Straus policies in this field. By the same reasoning, an automobile might be described as descendant of the dinosaur.

The Economics of Fuel Development

" . . . the nation's normal and expanding consumption of petroleum and natural gas, together with the long-range defense program, will not permit their diversion for power generation. The other sources of fuel, as Bureau of Mines experts testify, are so far from the stage of low-cost production that their use for any commercial purpose is not feasible."

An analysis of the supposed need and demand for vast amounts of new power in this region, as well as its economic advantages, casts grave doubt on the agency's rosy prophecies. Unlike the Tennessee valley, the Missouri basin is the breadbasket of the nation. In the western section, through the aid of irrigation and rainfall, the products are mainly animal feed, livestock, and small crops. On the semi-arid plains, the principal crops are wheat and corn. The basin contains more than one-fourth of the country's harvested acreage.

This accent on agriculture determines industrial trends. In 1939, and the ratio has increased in the intervening years, the processing of the region's food and kindred crops—grains, cattle, timber, wool, hides—comprised 40 per cent of all manufacturing. Save for these strictly local enterprises, as the Warne report notes, high transportation costs and the lack of a large or potential local market had deterred general industrial expansion. The major portion of the products grown and processed are shipped to distant consuming centers. It is an area of surpluses and shipments.

EVEN if Messrs. Chapman and Warne could provide cheap power for industrial use, a dubious prospect in view of the facts set forth in their blueprint, it would hardly stimulate agriculture or industrial growth. The amount of power required in these processing plants, which employ only thirty-five to fifty men each, is negligible. Any saving on power, which constitutes only 20 per cent of

production costs, would be offset by high freight charges on long hauls to market. The Warne report recognizes this dilemma. It says:

"High transportation costs and the absence of local markets are deterrents to industrial activity."

With characteristic optimism, the report suggests that these admitted barriers to development may disappear. The facts fail to concur. Inflationary trends since outbreak of the Korean "police action" in June, 1950, have forced the Interstate Commerce Commission to grant five increases in freight rates, and there are petitions for further relief before that body. Transportation costs are on the upgrade.

Census and Agriculture figures belie anticipations of expanding local markets. They show a steady drop in population and a decrease in the number of farms, with no indication that this movement to the cities and mechanization of agricultural production will be reversed. Per capita income ranges from 20 to 30 per cent below the national average, although Federal support of farm prices has brought some improvement.

Official calculations on future requirements of power rely on an equally unsound foundation. Noting that the demand for electricity has doubled each ten years since 1935, the report estimates that there will be a "5 per cent year-to-year increase from 1950 to 1960." This reliance on 1935-1950 expansion as an accurate indication of future growth may be faulty for obvious reasons.

FROM 1935 to 1940 this section was still suffering from a depression hangover, and could not afford electric luxuries or necessities in volume. From 1940 to 1947 World War II restrictions and postwar shortages prevented any civilian production and expansion except that essential for national defense and reconstruction. In the last five years, with a backlog of wartime savings plus cheap and technologically improved appliances on the market, industry and individuals met their needs in these lines. Although increased consumption of power in the basin is to be expected, there is no evidence that future demand will match Interior estimates.

THE Warne chapter on "potential" development of the basin's mineral wealth through application of "cheap" Federal power is as fantastic as the sections already analyzed. It has an Alice-in-Wonderland quality. It foresees the more intensive mining of phosphates and chromite reserves in Montana and Wyoming, manganese in South Dakota, iron ore and magnetite in Wyoming, bauxite and high alumina clay in Minnesota, Missouri, and Colorado. It lists such other products, although many lie in "contiguous areas," not in the basin itself, as a hodgepodge of bentonite, gypsum, vermiculite, gold, silver, lead, zinc, copper, limestone, cement, feldspar, vanadium, molybdenum, and sulphur. The prospectus glitters like the lyrics on the western hemisphere's riches which Columbus read to Ferdinand and Isabella.

In the first place, most of these minerals are now under private development, wherever the extraction and commercialization are feasible and profitable. The great and small

companies which have scoured this region for more than seventy-five years have overlooked no buried treasure. As of today, they are not conscious of any scarcity of power. Even if they were, the more profitable properties are located largely on the circumference of the basin, or outside it, and so inaccessible to the proposed Federal power system that they would not benefit from it. Otherwise, they would not be among the principal objectors to this invasion.

More importantly, the Warne treatise admits again and again that these "potential" ores and minerals are of such low-grade and high-cost quality that production on a large-scale, commercial basis is not now foreseeable; it would not be practical or desirable from any standpoint. But if, as the Warne document suggests, domestic and foreign crises become so aggravated as to make development of these poor ores worth while, this same inflation of all costs and values would offset all the economic advantages advanced as a reason for Federal exploitation of the basin.

Indeed, an apologetic note creeps into the Warne discussion of Federal mining prospects. Referring to South Dakota's reserves of low-grade manganese, it says that "economical recovery of these deposits is a possibility with improved technology and higher prices." It admits that iron ore deposits in Wyoming and Montana are "small," while the "quantity and quality of all the reserves are not known." As to titaniferous magnetite in South Dakota, it concedes that "the deposit has not been attractive for commercial development." In a general description of these widely scattered and commercially unattractive ores, it concludes that "world conditions may be the controlling factor with respect to their development." Translated into layman's language, this means that a continued crisis threatening the nation's security would force us to extract these critical and essential materials without regard to the cost.

In short, successful and profitable exploitation of the basin under the Chapman-Straus theories would depend on the presence of such imaginary and inexact factors as (1) low-cost power; (2) complete revision of the nation's delicate freight rate structure; (3) reversal of the outward flow of population; (4) the attraction of a large, local working force and consumers' market; (5) technological improvements in the processing of foods and minerals so as to lower production costs; (6) a World War III or such a prolonged semistate of war that sound financial and business principles will be discarded.

The Warne report's most peculiar feature, perhaps, is its complete

¶ "The *Warne report's most peculiar feature, perhaps, is its complete silence on the future relationship, if any, between the proposed vast Federal empire and the existing private utility companies which have served the area since it was first settled.*"

silence on the future relationship, if any, between the proposed vast Federal empire and the existing private utility companies which have served this area since it was first settled. In this connection, the predicament of the Union Electric Company of Missouri, as one of many similarly situated firms, deserves consideration. Union Electric operates in St. Louis and the southeastern and north-central parts of Missouri, where there are admittedly limited hydroelectric resources. It is in this section that the Interior planners, as they admit, would have to rely on thermal-electric plants and "importations" from outside the basin.

Union Electric has expanded progressively to meet its customers' needs. In 1950 it joined with four other firms to furnish power to a new atomic center at Paducah, Kentucky, under a 25-year contract. It has stepped up a 15-year building program that calls for new facilities costing $400,000,000.

It has also bought other companies or entered into lease arrangements with them so as to accommodate an expanding market extending from St. Louis to Kansas City. It has lowered rates as conditions warranted to its 488,000 industrial and 434,000 individual customers (1950 figures).

In 1950 it had a gross income of $71,790,000, which was distributed as follows: wages and employee benefits, $18,785,000; local, state, and Federal taxes, $13,132,000; fuel, materials, and other expenses, $14,669,000; provision for replacement of property, $7,736,000; interest costs, $4,408,000; preferred dividends, $2,164,000; common dividends, $10,588,000; reserve, $1,956,000. The investment in property and plant totaled $402,378,000.

Nowhere in the federalists' dreambook is there any mention or thought of Union Electric's fate. Yet it is typical of private utilities everywhere that would be driven out of business or forced to sell at almost confiscatory prices, if the 15-basin program were ever put into effect in accord with the specifications for the Missouri river basin. In other words, going enterprises that furnish satisfactory service, provide direct and indirect employment, pay heavy taxes on property and profits, and bulwark the American system of free enterprise, would be destroyed at taxpayers' expense to make a holiday for the bureaucrats.

"THOUSANDS of our people who abhor Communism and all its works unwittingly pursue courses identical, in their early stages at least, with those which ardent but non-revolutionary Socialists would heartily approve as preliminary measures. And it is a commonplace that Socialism is the halfway house on the road to totalitarian Communism. Americans of the ultraliberal persuasion, if challenged on the ultimate drift of the 'social gains' they espouse, would doubtless reply that a little Socialism is a good thing and that we can easily have as much or as little of it as we choose."

—EDITORIAL STATEMENT,
The Wall Street Journal.

The Heat Pump Up to Date

The next big step in the way of general utilization of electricity by the public will come with the heat pump—an electric device for heating homes and factories through the thermal temperature of subterranean elements, especially water.

By JOHN P. CALLAHAN*

MENTION the heat pump to a utility man today and you precipitate a conjectural conversation that could run on for hours. Prior to World War II one heard a lot of wishful thinking about that year-round heating and cooling phenomenon, but, like hundreds of other field and laboratory projects, its development for widespread use was stopped for half a decade.

Then, after the war, removal of heat pump production bugs had to wait until the numerous lines of electric appliance production began to roll again to fill an almost insatiable demand for irons, toasters, vacuum cleaners, washing machines, and other indispensable work savers for the housewife.

Now that part, if not all of the war-born demands, has been met, the manufacturers are looking over improved mock-ups and field units of advanced designs of the heat pump.

This year-round air-conditioning unit has been under experiment for about twenty years. What have been the reactions to tests? Depending on the source of your inquiry, they range from enthusiastic praise by manufacturers and a tempered optimism by most utility companies to doubt that the heat pump could compete, now, with other fuels.

But, on total, it would appear that "heat pump" is a phrase, or name, that soon will be part of the year-round air conditioning man's lexicon. One basis for drawing a conclusion might be the fact that there are 1,000 to 1,500 heat pumps in operation today in 36 states. (See Table A, page 162.)

By way of background for forward-looking analysis, let us explore the following points: (1) What is the heat pump? (2) How does it work? (3)

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What is its history? (4) What do tests show, including the manufacturers' and utilities' exploratory work? (5) What does it cost? (6) How will it affect power supply? (7) What is the consensus of reaction?

What Is the Heat Pump?

It is nothing more than the reverse operation of a compression type refrigeration system, with provisions incorporated in the design to put to use heat given up by the condenser, instead of discarding it.

TABLE A
Heat Pump Installations As of March 31, 1952

State	Residential	Commercial	Total
Alabama	5	12	17
Arizona	3	6	9
California	35	102	137
Colorado	1	0	1
Connecticut	0	2	2
Dist. of Columbia	0	2	2
Florida	109	115	224
Georgia	22	21	43
Idaho	20	1	21
Illinois	7	1	8
Indiana	24	6	30
Iowa	1	0	1
Kansas	7	2	9
Kentucky	2	3	5
Louisiana	0	2	2
Maryland	0	3	3
Michigan	2	1	3
Minnesota	3	2	5
Mississippi	1	1	2
Missouri	2	1	3
Nevada	4	2	6
New Jersey	1	4	5
New York	8	1	9
North Carolina	9	4	13
Ohio	16	8	24
Oklahoma	0	1	1
Oregon	47	17	64
Pennsylvania	2	1	3
Rhode Island	1	0	1
South Dakota	0	1	1
Tennessee	27	2	29
Texas	2	12	14
Utah	1	1	2
Virginia	11	14	25
Washington	49	7	56
West Virginia	6	6	12
Wisconsin	1	1	2
Totals 36 states	429	365	794

The unit's name derives from the fact that the heat absorbed at a low-temperature level is raised or pumped to a higher level.

How Does It Work?

For the less technical among us, there is an elementary explanation designed to help us to better understand the heat pump.

If you moisten your hand with alcohol, it feels cool. Why? Because the alcohol evaporates rapidly and carries with it heat from your skin. Water has the same effect but not so marked because of the slow rate of evaporation. So, in mechanical refrigerators the manufacturer uses some liquid that boils at a very low temperature. Sulphur dioxide will boil at 14 degrees above zero, ammonia at 27 degrees below zero.

Now, applying that explanation, in a mechanical refrigerator a low-boiling liquid evaporates in a coil. As it does, heat is absorbed from the air in the refrigerator's compartments and chills them. The exposed coil is soon coated with ice which shows that the moisture in the air of the compartment has been frozen.

When the liquid in the coil has been expanded into a gas it is compressed by an electric motor. The compression changes the gas into a liquid and the liquid becomes warm again so that more heat is generated. As the liquid expands and vaporizes the heat is again given off. So the cycle is repeated over and over again and in the repetition much heat is juggled. In a heat pump we save this heat taken from air (water would do just as well as a source of the heat) and we send it through the house.

There are four basic designs of heat

pump: air-to-air; air-to-liquid; water-to-water; and water-to-air. Mention of them brings up reference to energy sources: air, water, earth, and solar energy. The last captures the imagination.

But let us briefly consider each of the first three. The selection of a heat source is influenced by factors that include geographic location, weather conditions, and initial cost.

AIR. From the standpoint of availability, air is an economical source of heat. However, many sections of the United States have wide fluctuations in weather. When air is used as a heat source there frequently is the possibility of frost accumulating on the heat-absorbing outdoor coils. Despite such limitations, air is being used satisfactorily as the heat source in many locations.

A solution to the problem of delivering maximum heat when outdoor temperature is at a minimum may be the storage idea. Very briefly, a tank or container is charged with heat during periods of mild weather for use when outdoor temperature is very low.

General Electric, a pioneer in the heat pump field twenty years ago, is manufacturing heat pumps that use air-to-air. The reasons are, first, that air is universally available. Water, for example, is not, as we will explain further on. Also, there is the job of digging wells in many areas where the heat pump is installed. The equipment for an air-to-air heat pump system may cost more, but, manufacturers of such units say, it actually is cheaper in the long run because it does not require the sometimes costly dependence on water supply.

WATER. With a temperature of 50 degrees or higher, water is potentially a satisfactory source if it is chemically suitable and does not require extensive treatment or the use of expensive metals. Its ultimate disposal may pose a problem. Well water, lakes, rivers, water discharged from manufacturing processes, or any other supply where the temperature is too low for direct utilization, is usable. The chief disadvantage of well water—and this should be remembered by persons in rural areas who are considering water as a heat pump source—are uncertainty of supply and cost of drilling and maintenance. Disposal problems are significant because the heat pump is a once-through system that requires great quantities of water. Some cities have restrictions of discharge of large quantities of water into sewage systems.

Also, according to city expansion plans, it is not unreasonable to expect that with water supply and usage growing acute there will be restrictions, such as those ordered by some state regulatory bodies, that ground water from wells be conserved by returning it to the ground whenever it is used for comfort cooling.

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¶ "THERE *are four basic designs of heat pump: air-to-air; air-to-liquid; water-to-water; and water-to-air. Mention of them brings up reference to energy sources: air, water, earth, and solar energy. The last captures the imagination.*"

EARTH. Installations of coils in earth as a heat source use 200 to 400 feet of ¾- to 2-inch embedded pipe per 15,000 BTU hours of delivered heat. Moisture migration is a significant factor affecting the ability of soils to conduct heat.

The earth is the most universal source of heat. A cylinder of earth 30 feet in diameter and a 100 feet deep will give up 28 billion BTU if its temperature is lowered 10 degrees. If one assumes a 100-foot depth, and a heat pump unit delivery of 50,000 BTU hours operating an average of 20 per cent of the time over a 5-month heating season, the 10-degree drop in the 30-foot cylinder would supply the heat needed for an entire heating season if no heat flowed into the region.

The sun, whose temperature is about 6,000 degrees, supplies light, heat, and energy for all members of the solar system. It has been estimated by scientific authorities that the energy from the sun would melt a sphere of ice as large as the earth in 16.6 minutes. The earth intercepts only an infinitesimal part of the sun's energy, but it has been claimed that the average amount received at the earth's surface is 646,000 horsepower for every square mile of the globe we live on.

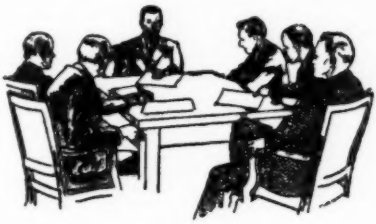
SOLAR energy, at sufficiently high-temperature levels, has been collected in a number of installations in Florida, California, Indianapolis, Colorado, and Massachusetts to permit direct utilization for comfort heating and for domestic hot water heating. The minimum temperature for direct utilization is 120 degrees.

Relatively high collection efficiency can only be obtained on a clear or slightly cloudy day, unless the energy is collected at a low-temperature difference. The low-temperature difference can be effectively maintained with a heat pump in which the evaporator or heat-absorbing surface, maintained at about 50 degrees, serves as the collector plate. A solar heat pump is under test at the Ohio Power Company's Philip Sporn plant and at the Graham station in West Virginia of the Appalachian Electric Power Company.

What Is Its History?

THE idea of using an engine for transforming quantities of low-temperature heat to a higher temperature was advanced in 1852. Lord Kelvin (William Thomson) presented before the Glasgow Philosophical Society, a paper on the economy of heating or cooling buildings by currents of air. He proposed to expand outside air in a cylinder and then pass the low-temperature, low-pressure air through a coil which was subjected to the outside air. The low-pressure air would be heated up to the approximate outside air temperature and then passed to a compression cylinder to be compressed back to atmospheric pressure. Its temperature would be raised well above the outdoor temperature and delivered to the room.

In the cooling cycle the outdoor air would first be compressed and then passed through a coil subjected to outside air temperatures. The cooled, compressed air would pass to an expansion cylinder, and the expanded air passing to the living quarters would be well below outside temperatures. The additional energy for making these transformations would be supplied by a steam engine. This type of system be-



War Stymied the Heat Pump

"MENTION the heat pump to a utility man today and you precipitate a conjectural conversation that could run on for hours. Prior to World War II one heard a lot of wishful thinking about the year-round heating and cooling phenomenon, but, like hundreds of other field and laboratory projects, its development for widespread use was stopped for half a decade."

came known as the Open Cycle Air Machine.

In 1877, J. J. Coleman, who had been consulted by the Bell shipping interests on mechanically refrigerating meat during overseas transit, discussed the problem with Lord Kelvin and, as a result of that meeting, Mr. Coleman devised a form of refrigerating machine later known as the Bell-Coleman refrigerating machine. This type of machine, used successfully in England, had as its main features, substantially those advanced by Lord Kelvin in his paper of 1852.

The first application of the heat pump appears to have been made in England shortly after World War I. The installations were industrial. Compressors were used to provide heat for drying or concentrating chemicals, sugar, and paper. As heat source, some of the installations used waste liquids or air having higher temperatures, however, than outside air or water.

THE use of mechanical devices to heat or to cool buildings did not become popular until electric energy became available at low cost. Summer air-conditioning installations began to grow in the 1920's. However, most of these installations were limited to public meeting places and processing rooms, and it was not until the late thirties that any consideration was given to cooling homes. Most of the domestic applications were limited to unit air conditioners, cooling only one room.

The use of mechanical devices for cooling stimulated experiments on mechanical heating. In 1927, T. G. N. Haldane made an actual experimental application in his home in Scotland. The equipment included a 5-kilowatt motor-driven compressor, an outdoor evaporator, and a condenser mounted in a duct supplying the living quarters.

That installation was equipped with valves in the refrigerant lines, so that the flow of the refrigerant could be reversed for cooling, enabling the evaporator and condenser to switch.

In the early thirties, American engineers, co-operating with utilities, started experimenting with heat pumps for heating and cooling both homes and offices. One of the first large commercial installations was in the offices of the Southern California Edison Company, in Los Angeles, where the volume conditioned was 3,800,000 cubic feet. Outside air was used as a heat source. With a minimum temperature limit of 42 degrees, the heat pump could supply full heating requirements. Electric resistors were used for supplemental heating whenever the outside temperature fell below 42 degrees.

ANOTHER early installation, using air as a heat source, was that of the General Electric Company twenty years ago in an average-sized family dwelling in Salem, New Jersey. The unit, according to latest reports, is still functioning satisfactorily.

During the decade through 1940, installations were made throughout the United States with a few in foreign countries, most of them sponsored by utilities and a few by manufacturers. In most cases some form of supplemental heating was provided for severe weather.

With reference to work on the heat pump abroad, development of it was given impetus in Switzerland by three factors: (1) wartime fuel shortages; (2) high-cost fuel; and (3) abundant water supply.

In the United States, the second world war retarded the experimental installations of the heat pump, although engineers were working on development problems. On the other hand, there were many conditions that favored use of the heat pump in the United States over Switzerland.

They included: (1) In Switzerland the high initial or first cost of a heat pump has to be supported entirely by the winter heat load, whereas in the United States it can be prorated over a full year's operations. (2) The low winter temperature of the water sources used in Switzerland reduces the operating efficiency just at a time when maximum output is required. If a ground source of heat were developed in the United States the operating efficiency could be kept relatively high throughout the entire year.

What Do Tests Show?

IN a report on a 2-year experiment with the heat pump, Philip Sporn, president of the American Gas & Electric Company, and E. R. Ambrose, an engineer of that utility, said it seemed to them "reasonable to expect that the number of heat pump installations will increase materially as engineers, architects, and contractors become more familiar with their many desirable features and with the various possible operating cycles."

Perhaps one of the most important statements in their comprehensive description of the experiment was that in which they said the "actual energy consumption during the heating cycle indicates that the operating cost of a heat pump system, using air as a heat source, is competitive with other fuels in the Roanoke (Virginia) area."

Another statement about the heat pump being competitive with other

heating installations has been made by A. C. Crandall of the Indianapolis Power & Light Company. According to him, tests made there during the 8-month heating period through May 31, 1946, showed the heat pump fared well in a test. The installation was operated in a one-story, 5-room house. Using heat from the earth the heat pump put into the house 3½ to 4 times the equivalent heat used by electric equipment, "making possible a reasonable cost for heating with electricity." The house measured 31 by 28 feet, and the first floor had 6,944 cubic feet of space. The wall exposure was 944 square feet, and the glass surface, 151 square feet.

The 350 to 400 per cent of heat delivered from the energy used per operation compared to the average fuel furnace delivery of about 50 to 60 per cent of the heat in the fuel. Total electric consumption for the eight months was 6,375 kilowatt hours, of which 6,013 were used by the 3-horsepower motor drive on the compressor, and 334 kilowatt hours by the one-half horsepower blower fan. Nine tons of coal were used during the 1943-1944 winter, before the house was insulated.

Using a heat loss coefficient minus 10 to 70 degrees, and one-half air change infiltration, the total radiation required was 38,193 BTU per hour, and 11,472 BTU per degree day. Estimates for other means of heating for the 1945-1946 heating season in that house were: 11,213 pounds of coal; 196,220 cubic feet of (570 BTU) gas; or 785 gallons of oil.

ONE of the most notably contrasting characteristics of the heat pump system is the location of equipment. In the Appalachian Electric Power Company's office building, with its 87,600 square feet of floor space, the outdoor air coils are in the penthouse atop the sixth floor. The outdoor air fans which are on the penthouse roof discharge the outdoor air vertically downward through the coils, then back to the outside. Basement storage tanks charged with warm or cold water, depending on the season, provide practical compressor selection.

The Appalachian heat pump consists of three 75-horsepower reciprocating Freon 12 compressors, each with its own heat dissipating and heat absorbing surfaces, and so arranged to give three independent systems.

Tests also have shown that the heat pump equipment required little maintenance and service during a 2-year period. There was some trouble with compressor shafts seals after the system began operating, also gasket and refrigerant leaks and the performance of 4-way valves. These difficulties, due to pioneer type of equipment, were soon eliminated.

What Does It Cost?

IF we assume an operating efficiency of 65 per cent for a conventional

¶ "JUST *as oil cut into the coal market, so, too, will the heat pump take a large part of the heating market away from both of those fuels. The manufacturers are proving they can do it, the utilities will find the electricity to power them, and the customers are waiting.*"

house-heating system, and a heat pump coefficient of performance of 4.5, the heat pump, using 1-cent per kilowatt hour electricity, is fully competitive with coal at $11 a ton, and oil at 5 cents to 6 cents a gallon. At 1½-cent electricity, the heat pump can compete with $16 coal and 8-cent-a-gallon oil; and with 2-cent electricity, it is equal to $20 coal and 10-cent oil. These figures merely represent the operating cost and do not reflect the many advantages of using a fireless furnace.

While most electric rate schedules designed for residential users do not go as low as one cent per kilowatt hour, there seems, at least to some observers within the power and light industry, no reason why they should not, in view of the much larger electric consumption that would result from heat pump use.

In Philadelphia an official of the utility company there has said that with the last block of the rate at 1.65 cents in that city, and 1.9 cents in the suburban area, the heat pump would be competitive with gas at 50 cents a thousand feet. Up to 50 per cent saturation of the heat pump in that territory, the utility company would be able to make a reasonable return on all of the investment applicable to it of 5 or 6 per cent.

But looking at the picture nationally there seems to be few areas where the heat pump is being used, or can be justified, on a cost basis with coal, oil, or gas.

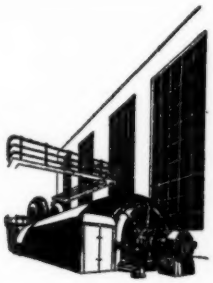
Electric energy is under a great handicap because of cost of distribution system that is required to supply power on a 1-to-1 conversion basis. Steam-generated electricity has the further disadvantage because of low conversion efficiency of power plant (about 29 per cent as compared with 50 to 80 for direct-fired heat).

MR. AMBROSE, from whose paper the preceding paragraph was excerpted and paraphrased, has said the heat pump offers a way of eliminating the handicap that electric energy is under when it attempts to enter residential or commercial heating fields on a straight energy conversion basis by furnishing 3 to 5 kilowatt hours of equivalent heat for each kilowatt hour of energy used. This makes possible and wholly practicable, Mr. Ambrose's studies find, the supplying of electric heating service to residential and commercial establishments without sacrificing any of the advantages of electric resistance heating.

While there are several manufacturers of heat pump systems, including General Electric, Westinghouse, the Frigidaire division of General Motors, the Muncie Gear Works, Typhoon Air Conditioning, and Drayer-Hanson, Inc., few are yet publicizing their wares or the cost of them. Research is going on intensively, and competition is keen preparatory, they all hope, to eventual mass production.

Visiting the General Electric Company's Bloomfield, New Jersey, plant, where the heat pump activity is concentrated, one would come away with this impression: This largest of the electrical equipment manufacturers is planning great things for its heat pump division.

Maybe GE will not put up a special heat pump plant next fall nor the heating season after that, but if the well-founded optimism continues, there is a good chance that something will be



Electricity Spurred All Air Conditioning

"THE use of mechanical devices to heat or to cool buildings did not become popular until electric energy became available at a low cost. Summer air-conditioning installations began to grow in the 1920's. However, most of these installations were limited to public meeting places and processing rooms, and it was not until the late thirties that any consideration was given to cooling homes."

cooking, literally, by 1955-1956. Except for generalities, there's little one can learn about the company's production schedule and the price of the heat pump.

But this much we know: GE, working quietly like its competitors, is turning out a heat pump system, using air as its heat source, at the rate of "at least several hundred a year." This writer heard very tentative estimates of the cost of a unit for a 5- or 6-room house running between $3,000 and $4,000. A larger, 8-room house installation might cost about $4,500.

SOME indication of cost also was obtained from the Chattanooga Electric Power Board of Tennessee. This, however, was in the latter part of 1946. But, again, it could be current information because of heat pump progress still going on at a comparative snail's pace in the American production scene. The cost of five installations there averaged $2,100 each, the price total arrived at this way: The unit cost $1,000; well, $600; duct or sheet metal work, $250; plumbing, electric work, and masonry and miscellaneous related work, $250.

C. B. Osborne, the board's sales manager, said then that the kilowatt consumption of the 3-horsepower heat pump installation in his own 6-room brick house with an hourly BTU heat loss of 66,000 would be under 5,000 kilowatt hours for a heating season. He added: "On our rates, or at an average of 6 mills per kilowatt hour, my season's heating cost should be roughly $30." In May, 1947, he said that from November, 1946, through April, 1947, his installation required 8,651 kilowatt hours, and declared he was "completely sold on it."

M. M. Smith, of the Muncie Gear Works, Inc., has said that "in time" we would see installations for $1,000 and that his firm was planning mass production of heat pump units for small houses at a cost of $600.

That Indiana firm's records show installations of a heat pump in a Muncie house that used 8,070 kilowatt hours from November 27, 1944, to June 11, 1945. The one-story structure was kept at 78 degrees day and night for the seven months. Estimates for the same type of house in several other cities, based on degree days for a full year with normal 72-degree day setting and 68 night setting was: Indianapolis, 7,947 kilowatt hours; Minneapolis, 11,755; Denver, 8,811; San Francisco, 4,896; New Orleans, 1,536; and New York city, 8,020 kilowatt hours. Mr. Sporn has said that in an average well-built 6-room home in Pittsburgh, a heat pump would require 8,900 kilowatt hours for heating and 2,000 kilowatt hours for cooling. At 1-cent electricity it would cost $109 year-round.

How Will It Affect Power Supply?

ON the power supply, a guest speaker at the Edison Electric Institute's 1947 convention in Atlantic City, New Jersey, said, on June 2nd, that the average annual residential kilowatt-hour consumption at that time of 1,200 would soar to about 10,000 "within a brief period." Well, of course, that hasn't happened yet. But in the light of subsequent reduced power reserve margins, it has been a sort of nightmarish thought for the men who heard it five years ago. It might even happen some day!

Speaking the mind of most utility men who have known nothing but expansion as regards power supply, Mr. Ambrose said quite recently that American Gas & Electric would "meet demands" for additional electricity. He emphasized that the industry was in the midst of an expansion program that would continue indefinitely, or as long as the demand warranted it.

What's the national demand like? In 1940, total residential consumption of fuel for heating was 5,038 trillion BTU, but of that amount only 47 per cent was useful in actual heating of homes, while 53 per cent escaped through the chimney. The total fuel bill that year (it is a good prewar year for our comparison purpose) was estimated, conservatively, at $1,682,000,000, of which more than half went up in smoke.

The average home owner probably has no idea how wasteful and uneconomical a furnace can be. The annual useful heat was 2,382 trillion BTU. In terms of electricity, this represented 697 billion kilowatt hours.

When we stop to consider that total sales of electricity for residential consumption five years later—in 1945—was 34 billion kilowatt hours, we can see how potentially important this heat pump load could be to the utilities.

AS a potential load factor for the utilities, the heat pump offers a profitable residential load exceeding many times the present residential electric energy consumption of all other electric appliances combined.

In 1940, there was an estimated 34,000,000 heating installations in the United States using about 2,382 trillion BTU of useful heat which, when converted into equivalent electric en-

gy units represent annually 697 bil-on kilowatt hours. This means a 4 per nt saturation of heating customers ith heat pumps would approximately ual total residential electric con-mption for 1944. (It was 29.7 bil-on kilowatt hours that year.)

In Seattle, Washington, where the unicipality owns the lighting and ower system, the sale of heat pumps being discouraged for two reasons, cording to A. W. Ames of Seattle ty light: (1) the high-cost factor for e consumer; and (2) the "acute ortage—so acute that no large load the order of, say, 50,000 kilowatt ours, could be taken on at once. All ailable electric energy remaining resumably he meant after customers' rdinary power demands are met] ould go toward industrial develop-ent, construction, and creation of the neral welfare, rather than the neces-ry comfort which may be had by her means."

What Is the Consensus of Reaction?

HERE is what the dubious say, sub-stantially, about the heat pump: oubtful if electricity could be profit-ly sold at one cent or even 1½ cents kilowatt hour to carry the heat pump ad. It has a poor diversity factor. ne utility's policy may be retention of wnership of the units. In this way, is utility thinks that it could regulate eration beneficially.

Another point heard against the at pump came from a utility official ho said recently that the present in-allation cost usually is 10 per cent to per cent of the total cost. Residen-l use for some time to come un-doubtedly will be in relatively high-cost homes.

Finally, on this score, the world's largest utility company, the Consolidated Edison Company of New York, Inc., recently got rid of one of its three heat pumps that were under test and study. The utility said: "They are not suited to this locality."

But indicative of the hopes and expectations for the heat pump, here is one quotation that might tend to offset the remarks of the pessimists. It was voiced by Mr. Sporn who told a group of utility men in a Birmingham meeting not too many summers ago: "I know of no development that will affect the power and light industry as will this project, the heat pump."

And a General Electric salesman said, eight years ago: "it is not impossible to imagine that heat pumps may some day be required just from the point of view of conservation of national fuel sources."

WELL, of the two schools the optimists have much the greater reason for their stand. On a year-round basis, the heat pump is competitive. As time goes on, accompanied by the fruits of the intensive research being conducted by manufacturers and by utility companies, it will become more apparent that a new era of heating is about to begin. It's too early to say that it has arrived. Just as oil cut into the coal market, so, too, will the heat pump take a large part of the heating market away from both of those fuels. The manufacturers are proving they can do it, the utilities will find the electricity to power them, and the customers are waiting.

Washington and the Utilities

The Power Issue—Up or Down?

CANDIDATE Eisenhower apparently does not intend to be diverted in the forthcoming campaign from his main theme of "turning the rascals out" by any extended discussion of public power policy. Prior to the Republican convention the General announced his support for the St. Lawrence seaway-power proposal. But the U. S. Senate took this project out of the campaign by a very bipartisan vote which just about ended chances of Federal participation.

The Republican platform, which the General has approved, very bluntly announces opposition to valley authorities which involve overcentralization. Eisenhower has himself repeatedly sounded a warning against overcentralization of Federal authority.

The public works plan of the GOP platform contains the following passage:

> We vigorously oppose the efforts of this national administration, in California and elsewhere, to undermine state control over water use, to acquire paramount water rights without just compensation, and to establish all-powerful Federal socialistic valley authorities.

In other passages this platform generally approves "application of sound land management, reforestation, and water management practices on each watershed." It supports "bona fide farmer-owned, farmer-operated co-operatives and urge the further development of rural electrification and communication, with federally assisted production of power and facilities for distribution when these are not adequately available through private enterprise at fair rates."

WITH the Republican party otherwise opposed to Federal ownership of tidelands (Eisenhower has previously taken this stand) and "eventually local ownership of federally sponsored, reimbursable water projects," it would appear that both the GOP platform and the Republican candidate are not going to get excited over any "public power issue." The Democrats on the other hand seem likely to follow President Truman's lead in emphasizing the benefits of federally financed, built, and operated public power projects. At his July 2nd address, at the Bull Shoals dam dedication, President Truman berated the private power companies without restraint. He identified them with "the forces of reaction and selfishness." He accused them of wanting to make the farmers pay more for their electricity. "It is as simple and as shocking as that." He called Socialism "a lying slogan" used by the private power companies as well as by the American Medical Association and the real estate interests to obstruct Fair Deal measures. In an opening plea for southern support, he reminded his listeners that the New Deal and Fair Deal had done more for the South than any other part of the country. "Remember these things this year, when you see and hear the storm of political propaganda that will be put out to try and turn back the clock."

Hence the conclusion that Truman, at least, is preparing to make public power the number one campaign issue in every state in the Union. He said, "no matter what the private power companies do or say, if I have my way about it, we are going right ahead and develop our water resources all over this country."

But what happens in the minds of the

voters when one side insists on talking about one thing and the other about something else, like two prize fighters shadowboxing in different rings. It would be, of course, that the Democrats will continue shadowboxing on the power issue for the rest of the campaign, while Eisenhower tries to pile up points on the numerous other issues available to the GOP. If voters are anything like fight fans, they won't like a contest along those lines nor stand for it very long. But whether they will take out their resentment on the elephant or the donkey is one of those questions which must wait for an answer until November 4th.

McCarran Rider Surprises

LAST month when the Senate passed a bill (S 18) by Senator McCarran (Democrat, Nevada), permitting a water user to take the Federal government into court without prior consent of Congress, public power proponents protested that it was "legislation dangerous to Federal power policies." *Rural Electrification Magazine*, organ of the National Rural Electric Co-operative Association, bewails the fact that it had slipped through the Senate "almost unnoticed."

But Senator McCarran's coup in the final hours of the session was even more successful—since the bill was tacked on as a rider to an appropriation bill (HR 7289) carrying funds for the Department of Justice. This strategy minimized the danger of a Truman veto. The original bill was designed to relieve the Federal government of its sovereignty in any litigation involving the use of water for any purpose, including hydroelectric generation. The idea of the bill, now law, is to give the state courts final jurisdiction over the use of their own water resources.

The enactment of this legislation probably makes unnecessary any further effort of state rights proponents to make the Federal government obey state water laws. (Expressed in the case of the Santa Margarita Bill (HR 5368) which finally failed to pass.) The McCarran rider seeks to protect private water rights along streams or rivers which may be threatened by Federal claims. An earlier section of the McCarran Bill, providing for a "water rights inventory" by the Interior Department, was not contained in the rider.

Truman's Water Project Bill

THOSE who have been privileged to peek inside of Budget Bureau operations, recently, know what President Truman had in mind when he spoke about a water resources bill which he expects to recommend to Congress before he leaves office. The President's statement was made during his address at the Bull Shoals dam dedication. Speaking of the Water Resources Policy Commission report, Truman said, "Before I leave office, I expect to have some important recommendations stemming from that report to be presented to the Congress."

It now develops that the Budget Bureau is preparing a bill which will simply recodify water project law. The Budget Bureau is polishing the final draft in preparation for the White House. The proposed bill is significantly different in purpose from the tentative Water Resources Policy Commission Bill, and also differs in philosophy. It will be recalled that Morris Llewellyn Cooke, exchairman of the defunct WRPC, released a "proposed" draft, last March, of a bill to set up 15 basin commissions and otherwise carry out the WRPC report.

Apparently the "Truman" water policy bill is to be a Federal water resources planning bill. There is little attention given to state rights. They would not be participants even in the window-dressing manner proposed in the WRPC report. The bill to be proposed by Truman is what could be expected of a bill coming out of the Budget Bureau. It gives much attention to allocation and repayment of project costs. It emphasizes the importance of the presidential

office in determining national water policy. It would not create any new Federal agencies or reorganize any of the existing ones. All revenue funds would go into the U. S. Treasury for reappropriation. No "continuing funds" or "revolving funds" would be permitted under the bill's provisions.

EEI Head Replies to Truman's Attack

"LET the enterprise system work and we will provide the kilowatts for a strong and prosperous America without benefit of government subsidy," B. L. England, president of the Edison Electric Institute, said in a statement following Truman's antiutility speech July 2nd at the dedication of Bull Shoals dam, Arkansas. "The key to peace is a strong America and production is its foundation. The industry is providing the electric power for this rapid growth and is perfectly capable of doing so without government competition," he said.

The power industry is thinking in terms of a trillion kilowatt hours in 1970, according to the EEI spokesman. "Capacity of electric power systems is scheduled to reach more than 82,000,000 kilowatts by the end of 1954. The rapidity of this expansion is appreciated when it is known that in 1942—just ten years ago—the installed capacity was 37,000,000. A whole new industry has sprung up in that time to meet every need for defense and an expanding civilian economy. This was done at no cost to the taxpayer."

Electric power, EEI President England pointed out, is one of the few raw materials that a manufacturer gets at less cost than ten years ago. He cited National Industrial Conference Board figures to show that the manufacturer's 1939 dollar would buy 39 cents worth of raw materials today. However, the electricity the manufacturer buys for a dollar today would have cost $1.12 in 1939. "This declining cost in the face of inflation is a credit to the resourceful and research of the electric industry," said. (The industry's long-range p ning anticipates 13,000,000 new cus ers by 1961.) He added: "We never failed to give them an adeq supply of electric power yet, and the generation will get all it wants at rea able cost."

Gas Bill Passes Senate

ANOTHER surprise in the last mi scramble of Congress to adj was the Senate's passage of the O'C or Bill (S 1084), which would rel intrastate gas distributors from Fed Power Commission regulation. Th was no companion measure in House. So the bill dies with the sess but with the prestige of passing chamber of Congress. This should m progress easier in the next Cong where the Senate will probably promptly, perhaps without the forma of additional hearings.

The bill was reported unanimously the full Senate Interstate Comm Committee. It had the approval of FPC and the support of the National sociation of Railroad and Utilities C missioners. The Senate passed the "on its merits" after defeating amendment (52 to 21) by Senator Do las (Democrat, Illinois), which wo have confined the exemption to gas tributors supplying a single metropoli area.

In effect, this bill would circumv the U. S. Supreme Court decision in East Ohio Gas Company Case, wh subjected gas distributors to FPC c trol.

During the debate, Senator C (Republican, South Dakota) called tention to the need for the measure. said: "Enactment of this bill is requi because there is a jurisdictional disp between the state public utilities comm sions and the Federal Power Comm sion. This bill is an effort to work these differences and to reconcile the

xchange Calls And Gossip

Ohio Commission Seeks to Improve Rural Service

HE public utilities commission of Ohio "is not happy with the status ural telephone service in Ohio," ac- ing to Paul D. Deaton, the commis- 's secretary. Deaton told the Fair- (Ohio) County Farm Bureau last th that the Ohio commission will not atisfied until the state has a better l telephone service than all the other es.

eaton outlined the steps the commis- has decided to take to improve rural hone service. First, it has decided there must be a definite relationship ween rates and services. By way of tration he cited the case of the Elyria phone Company, which was grant- n increase in rates to go into effect oon as the company installed new chboards, toll positions, and more s. The commission felt that too much ey had been taken out of the com- y and ordered Elyria to pay no more k dividends without commission ap- val. At the same time the company required to hire additional main- nce men to make repairs on holidays week ends. The company has ap- ed the decision to the state supreme rt.

second step taken by the commis- was the hiring of six resident tele- ne engineers to "make regular in- tions" of the inside and outside nts of the telephone companies. ton announced that a third new ciple adopted by the commission is of holding complaint hearings away n Columbus. He said this procedure adopted "to save people in the out- lying districts the difficulty of making long, expensive trips into the state capitol . . ."

DEATON said the commission was about to take the unprecedented action of ordering a company to explain in detail why it had not complied with a commission order requiring it to install some new long-distance switchboard positions. He said the company could be fined $1,000 a day for every day it is found in violation of the order.

The Ohio commission is also considering setting up a telephone clinic to which all company executives would be invited to hear the commission's position on telephone matters. It would be the first time such action ever has been taken by any commission in the country. Deaton said a tentative list of speakers for this clinic "would include the three commission members and representatives of the staff. We would also endeavor to obtain the services of members of leading financial institutions, such as the Chase National Bank in New York, which has a special rural telephone financing program. In addition, we would invite a nationally recognized engineer and, finally, we would seek representation from the farm bureau and the REA headquarters in Washington."

Deaton hinted that the commission would seriously consider REA proposals for rural co-operatives in Ohio if it found that "the telephone companies were not taking proper steps to bring about rural telephone service." He expressed his own view that telephone co-operatives may prove to be the answer to Ohio's rural telephone problems anyway. "There is already a considerable

group of people," he remarked, "who believe that we are now in the same spot with regard to telephone service as we were fifteen or twenty years ago in regard to electric power. The people who believe in co-operatives are saying that the privately owned telephone companies either cannot or are not expanding their markets to meet the needs of the people just as the electric power companies failed to expand in the days past."

THE Ohio commission is now studying its first application for authority to operate a telephone co-operative in Ohio, Deaton told his audience. He said the case comes from a sparsely settled area where four or five small privately owned companies have been operating for thirty or forty years. A co-op is seeking to serve dissatisfied and unserved families in the area. Deaton said the co-op's application is strongly opposed by the existing companies and "is being watched with great interest by the Ohio Independent Telephone Association, its members, and the Ohio Bell Telephone Company."

Deaton noted that as soon as the co-op requested authority to set up its own company in the unserved area, "the privately owned telephone companies immediately filed maps including the unserved districts in their operating territories. Of course," he continued, "they could have done this five, ten, fifteen, or twenty years ago but the commission has recognized that they did not seek this authority until the spurs were put to them by the co-operative."

It has been suggested that a possible solution would be to permit the co-operatives to operate in districts which previously were not included in the boundaries of any company. However, the commission feels that this will probably not satisfy the privately owned companies.

Though final disposition of this case is still to come, Deaton emphasized its importance in bringing to the commission's attention the matter of telephone co-operatives in Ohio. "You may be assured," he concluded, "that it will be given thorough consideration as a possible solution to this state's rural telephone problems."

Communications Equipment Division Gets New Director

THE National Production Authority's Communications Equipment Division has a new director. He is Everett C. Roys, vice president of the Pennsylvania Telephone Company on leave, who has been serving as CED's deputy director under William M. Day. Day took over at CED last March and has now been promoted to NPA Assistant Administrator in charge of the metals and minerals bureau—one of the most difficult and responsible posts in the government's control program.

Roys will serve as director until about October 1st, when his 6-month assignment in Washington expires. At that time the next director of CED, reportedly a Bell system executive, will take over as director of the division. A new deputy director, representing the independent branch of the telephone industry, will also be appointed at the same time.

Day has been notably successful in bringing to the attention of NPA officials the needs of the communications industry, particularly with respect to copper. He first came to Washington in 1941, on leave from American Telephone and Telegraph Company, in a special assignment to the War Production Board. In 1948, after serving as assistant vice president in charge of AT&T's public relations, he joined Michigan Bell.

Last March he took over direction of CED where his administrative abilities soon attracted the attention of key officials in the Defense Production Administration. In his new post, he will be primarily responsible for co-ordinating and directing the flow of basic materials —aluminum, copper, steel, and other vital metals—to the nation's mills and processors.

Day will report directly to NPA Administrator Henry H. Fowler.

Financial News and Comment

By OWEN ELY

Ownership of Utility Stocks

In the past there has been a great deal of guesswork and conjecture regarding the distribution of ownership of common and preferred stocks in the United States. President Keith Funston of the New York Stock Exchange, at the beginning of his present term of office, proposed a complete study of this topic, which was undertaken by the Brookings Institution of Washington, D. C., with the co-operation of a number of stock exchanges and a large number of business concerns. The results were recently published in a 140-page brochure entitled "Share Ownership in the United States," by Lewis H. Kimmel. The study contains 130 tables, covering almost all conceivable classifications of common stock holdings. The study also examines the questions of "beneficial ownership," which to some extent has concealed the identity of substantial stock holdings.

DEPARTMENT INDEX

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The study should be of special interest to the utility industry because of the large amount of equity financing which still remains to be effected in order to carry on the huge construction program of the industry. Some of the more interesting data affecting utilities are summarized in the table on page 178.

There are some 18,500,000 holders of common stocks and 1,800,000 holders of preferred stocks. However, individual holders of common stocks account for 79 per cent of the total holders, but only 47 per cent of the market value of holdings—the rest being held by joint accounts, fiduciaries, institutions and foundations, brokers and dealers, nominees, and others.

The exact division of stock holdings between the sexes will probably never be worked out though the brochure has some interesting figures on this question. While women probably have a preponderant ownership interest, men doubtless exercise greater voting control.

The analyses of geographic distribution of shareholdings reflect the great concentration of wealth in the Northeast. Of the total number of shares held in the United States, 3,656,000 or nearly 9 per cent are held in New England (principally Massachusetts and Connecticut) and 44 per cent in the Middle Atlantic states (three-quarters of which are in New York). Thus over half of the shareholdings are lodged in a few northeastern states. The Pacific coast area

with nearly 11 per cent and the South Atlantic area with 9 per cent have the next largest holdings. Of course the heavy concentration in New York and some other states is partly accounted for by the amounts in the names of nominees, brokers, and investment companies, which may hold the shares for people in many states. Thus here again the real picture is obscured by our inability to analyze indirect holdings.

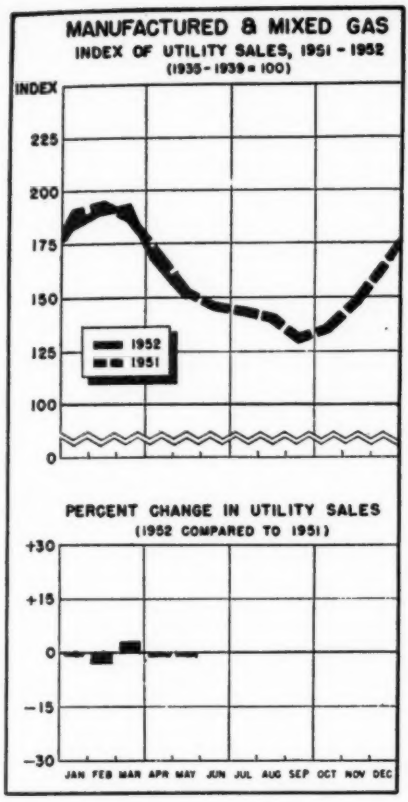
On page 28 of the brochure is a table showing the market value of total shareholdings and the average value per share holding by type of business. The aggregate market value of utility common stocks approximates $16.9 billion compared with the total for all groups of about $122 billion so that utilities account for some 14 per cent of the total. The average value of each holding for utility equities is $4,152 contrasted with the average for all types of $6,594—the latter is largely accounted for by such high-priced groups as metals, glass, chemicals, drugs, and oils. As previously indicated, utilities make a strong showing with respect to preferred stocks, market value being about 30 per cent of the total for all types of business.

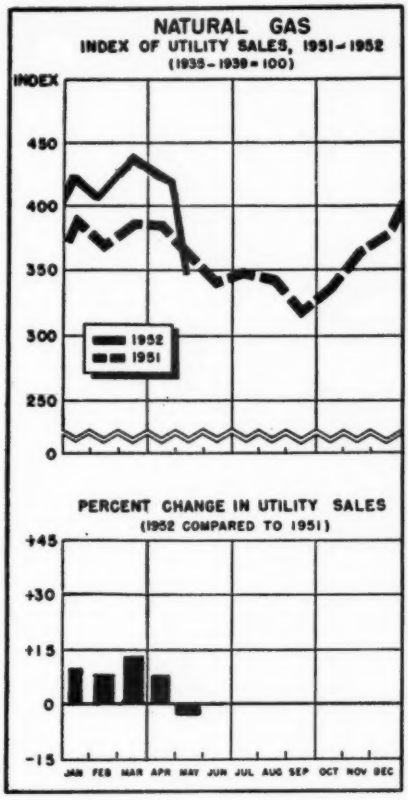
ON page 42 shareholdings are classified by size of holding and type of business. This indicates that utility shares are well distributed among small er holders, since shareholdings of les than 100 shares accounted for 28 pe cent of the total market value of all suc small holdings—this percentage bein about double the utility percentage fo all-sized holdings. Conversely, utilit holdings of 1,000 shares or over account ed for less than 10 per cent of such larg holdings of all business types. There wa a more even distribution with respect t preferred stocks.

Despite the comparatively large num ber of stockholders, this form of savin by *individuals* is still comparativel small. One hundred and four millio people (including servicemen and vet erans) hold life insurance, 53,000,00 have savings accounts, 43,000,000 hol Series E Bonds, over 14,000,000 hav annuities and pensions, but stocks classe as publicly owned are held by onl about six million people, and privatel owned issues by three million persons.

Some inquiries were made as to indi viduals' reasons for acquisition of pub licly owned stocks. The desire for ap preciation outranked the desire for in come in the ratio of 28 to 22, it was dis covered. Perhaps this is the basic reaso why stocks are not more widely owne by individuals in this country. The util ity industry, in selling its common stoc issues, should stress the higher yield a

Type of Business	*Number of Stock Issues* Common	Preferred	*Number of Shs. Outstanding (In Millions)* Common	Preferre
Public Utilities				
Electric & Gas	120	178	298	52
Gas	58	41	99	3
Communications	25	24	66	3
Miscellaneous	16	16	8	2
Total	219	259	471	60
Manufacturing	1,411	484	1,454	67
Oil	123	15	458	2
Mining	154	14	249	3
Transportation	154	72	161	23
Finance & Investment	588	76	498	7
Others	283	102	236	6
Totals All Groups	2,932	1,022	3,527	168
Ratio of Utilities to All Groups	8%	26%	13%	36%





compared with most other forms of investment, and the safety of income as measured by long dividend records.

Cost of Flotation

THE Securities and Exchange Commission has just issued its 54-page pamphlet report on "Cost of Flotation" for the first quarter of 1952. The statistics of principal interest are the percentages of gross proceeds required to cover underwriters' compensation and estimated other expense. These percentages differ widely with the size and character of new issues. The cost of floating small issues seems almost prohibitive. Thus in February, Texas Industries, Inc., sold $1,000,000 convertible debentures at a total cost of nearly 10 per cent—6.0 per cent for underwriters and 3.7 for other expense, which included $18,000 professional costs, $13,350 for printing, etc., and $5,750 for taxes and fees. On the other hand the electric utility companies were able to issue mortgage bonds at an average total cost of around 1 to 1½ per cent of the issue—the low cost probably being due to simple wholesaling of the bulk of these issues to institutions. The cost of selling preferred stock was considerably higher, ranging between 2.4 per cent and 3.9 per cent, since institutional demand is apt to be erratic and greater sales effort and risk are involved. The cost of common stock issues during the quarter

varied widely, as reflected in the figures for utility issues shown below:

THESE cost percentages (for equity financing) do not give the complete story. They should be supplemented by price analyses showing the price discounts from the market prices prevailing before the new financing was announced. Such discounts vary widely with general market conditions, the frequency of new offerings (sometimes there is a glut of new issues), the current demand from institutions or other important buyers, etc. Such studies are prepared from time to time on individual offerings by the Irving Trust Company or others. The Edison Electric Institute (financing and investor relations committee) prepares individual report sheets on new issues which show for stock offerings the price of the stock a month prior to the offering, at the offering date, and at the expiration of the subscription rights. These data might afford the basis for a study at some later date on average price discounts.

An Optimistic Forecast for 1961

THE McGraw-Hill Department of Economics recently made a study of growth potentials during the coming decade — on the assumption that there will be no war and no major unemployment meanwhile. The forecast for 1961, compared with actual figures for three previous decades, is shown in the accompanying table. The study includes brief discussions of the outlook for individual industries, including the electric and gas utilities, electric appliances, etc.

Sales of industrial power are expected to be 50 per cent larger in 1961 than in 1951, and residential sales should more than double. Some of the biggest users of electric power are leading growth industries, such as the chemicals, light metals, etc. In 1951 industry used about a billion more kilowatt hours for each point rise in the Federal Reserve Index, but by 1961 the units should be one-third larger, the study estimated. With increased lighting and air conditioning and greater use of electricity in restaurants, commercial sales are expected to double.

THE McGraw-Hill study indicates that there is still a large unsaturated market for TV sets, electric heaters, and air conditioners, dishwashers, disposal units, clothes driers, etc. Further, increasing farm electrification is an important factor. Thus use of electricity per residential customer is expected to double while the number of customers will also increase. In order to handle this larger load, capacity is expected to double by 1961. This would seem to indicate that the utilities must shoulder another construction program in 1955-60 somewhat similar in scope to that of 1951-55.

Natural gas sales almost doubled between 1946 and 1951, and the forecast states that they could again double, per-

Company	*Amount (Millions)*	*Total Cost Percentage*
Kansas City Power & Light	$8.4*	2.4%
Pacific Power & Light	8.8	3.2
Dayton Power & Light	8.2*	2.3
Southwestern Public Service	4.4*	4.2
West Penn Electric	12.7*	1.9
Maine Public Service	.5*	8.1
Black Hills Power & Light	.6*	10.8
Texas Utilities Co.	13.3*	1.8
Texas Eastern Transmission	10.4*	3.3
Middle South Utilities	13.2	2.7
Arizona Public Service	5.1	6.0
Portland General Electric	6.9	5.0

*Subscription offering to stockholders.

ECONOMIC TRENDS AND FORECASTS

	1931	1941	1951	Est. 1961
Population (Millions)	124	133	154	175
Number of Employed (Millions)	43	52	64	68
Average Hours in Workweek	47	44	44	40
Output Per Man-hour	$1.35	$1.94	$2.24	$2.70
Industrial Production Index	75	162	220	260
Gross National Product (Billions)	$140	$230	$328	$380
Disposable Personal Income (Billions)	$110	$165	$223	$260
Consumer Expenditures (Billions)	$107	$148	$205	$255
Government Expenditures (Billions)	$ 21	$ 47	$ 64	$ 60
Business Capital Spending (Billions)	$ 14	$ 14	$ 23	$ 27
New Construction (Billions)	$ 17	$ 25	$ 30	$ 36

haps will triple, in the next ten years.

The study is interesting and valuable, but what is also needed is a well-reasoned forecast as to whether the cold war will maintain the defense program at current levels until 1961, or whether World War III will occur before that time—and if neither of these occurs, whether the next administration will use pump-priming sufficiently to offset any letdown in consumer buying. In other words what we really want to know is how soon an economic depression may be due and whether it can be avoided.

Utilities Serving Latin America

LATIN America, which includes virtually all of America below the southern border of the United States, is served principally by three large utility holding company systems—American & Foreign Power, with annual revenues of $161,000,000; Brazilian Traction Light & Power, with revenues of $150,000,000; and International Telephone & Telegraph, with world-wide revenues of nearly $300,000,000. These companies have enjoyed tremendous growth which, however, has reflected currency inflation as well as gain in output. Thus in the decade 1942-51, Foreign Power's revenues increased 150 per cent while its electric output gained only 82 per cent, and generating capacity only 23 per cent. Brazilian Traction's revenues (from electric light and power, gas, water, telephones, and transit) increased 222 per cent in the decade, and its electric output in kilowatt hours about 120 per cent.

THESE companies issued interesting and elaborate stockholders' reports for 1951. American & Foreign Power devoted a substantial part of its report to discussing economic trends and the foreign exchange situation in 12 Latin American countries, and to developments directly affecting various subsidiaries. "Problem countries" were Brazil, Chile, Mexico, and the Argentine.

In both Brazil and Chile there were shortages in dollar exchange, which situation still remains serious. In Chile and in Mexico there have been delays in obtaining adequate rates to meet higher wage costs, etc. The $100,000,000 investment in the Argentine is virtually "frozen." The table in the back of the report shows the proportion of system revenues obtained in each country—Brazil contributing 28 per cent, Cuba 26, Chile 18, Mexico 9, Venezuela and Argentina 5 each, and Colombia and Panama 3 per cent each, while Guatemala, Costa Rica, and Ecuador accounted for only 1 per cent apiece. Total revenues were 92 per cent electric, 4 per cent transit, 3 per cent gas, and 1 per cent telephone and miscellaneous.

American & Foreign Power was reorganized early this year and there is considerable conjecture as to when the company may initiate dividends on its new common stock. Consolidated earnings for the twelve months ended March 31, 1952, were $1.80, considerably below the forecast presented some time ago

GAS UTILITY CONSTRUCTION EXPENDITURES, BY TYPE OF GAS AND BY PLANT FUNCTION, 1951-1956
(Millions)

Type of Gas and Plant Function	*Actual*	*Forecast*					*Total Forecast 1952-1956*	*Total Actual 1947-1951*
	1951	*1952*	*1953*	*1954*	*1955*	*1956*		
Natural Gas—Total	$1,363	$1,067	$1,571	$1,206	$645	$610	$5,099	$4,560
Production	124	91	102	72	75	75	415	511
Transmission	867	607	1,133	820	275	240	3,075	2,939
Underground storage	42	40	20	12	5	5	82	a
Other storage	15	5	6	12	10	5	38	a
Distribution	271	279	279	264	255	260	1,337	958
General	44	45	31	26	25	25	152	152
All Other Types of Gas—Total	98	106	110	98	91	91	496	586
Production and storage	19	31	39	29	23	28	150	221
Transmission	6	1	2	2	4	2	11	23
Distribution	66	70	62	61	55	54	302	314
General	7	4	7	6	9	7	33	28
Total Industry—Total	1,461	1,173	1,681	1,304	736	701	5,595	5,146
Production and other storage	158	127	147	113	108	108	603	732
Transmission	873	608	1,135	822	279	242	3,086	2,962
Underground storage	42	40	20	12	5	5	82	a
Distribution	337	349	341	325	310	314	1,639	1,272
General	51	49	38	32	34	32	185	180

a Included in production.

in connection with the SEC hearings on the plan. It had been anticipated a year or two ago that dividends might be paid at the annual rate of $1, but more recently an 80-cent rate has been discussed. The stock is currently selling around 9¼, or about 5 times consolidated share earnings.

BRAZILIAN TRACTION'S report is also quite elaborate, with an interesting two-page panoramic view of a new hydro project, four pages of maps, and many attractive illustrations in color and black and white. System subsidiaries serve the principal cities of Brazil—Rio de Janeiro, Sao Paulo, and Santos, a large seaport—so that they handle nearly two-thirds of the electric power business in the country and about 80 per cent of the telephone business. The report gives a fascinating picture of the economy of Brazil, which now includes many diversified and rapidly growing manufacturing enterprises.

Brazilian Traction (the parent company) is a Canadian holding company with comparatively small mortgage debt or priorities, following the British tradition. A strong current position is maintained, with system net current assets at the end of 1951 approximately $54,000,000. As a result the company has been able to weather many difficulties, paying dividends on its common stock since 1912 with only three interruptions—1918-21, 1933-5, and 1939-40. The stock is currently selling on the Curb exchange around 11, paying $1.

The 43-page report of International Telephone & Telegraph has to cover a great deal of ground because of the company's world-wide and varied interests. Pictures of a microwave research tower, a supertension laboratory, and a railway control center illustrate the company's strong position in the research field. System telephone and radiophone operations in Latin America—principally in Chile and Cuba, but with fairly substantial business in Brazil, Peru, and Puerto Rico —are described somewhat briefly. The report seems disappointing from the statistical angle—it does not give a breakdown of earnings by regions or character of business, except for the distinction between sales and telephone revenues. Figures gleaned from the 1950 10-K report

seem to indicate that the Latin American operations are a comparatively small part of the total picture, both with respect to gross and net.

Gas Industry to Spend $5.6 Billions for Construction in 1952-6

THE American Gas Association recently issued a forecast that construction expenditures for the gas industry in the 5-year period 1952-6 would amount to $5.6 billions, compared with $5.1 billions spent over the previous five years. A breakdown of actual expenditures for 1951, together with the forecast for 1952-6 and a comparison of the two 5-year periods, is shown in the table on page 182.

Despite shortages of pipe and other materials, total expenditures last year aggregated $1,462,000,000, a gain of 22 per cent over 1950. Expenditures for this year are expected to taper off to $1,173,000,000, slightly under the 1950 figure; the slackening seems due to the completion last year of several large projects, as well as continued allocation and material difficulties. However, next year's program is set at $1,681,000,000, a new record high, after which there will be a sharp decline in an estimated $701,000,000 in 1956.

The program for financing this projected construction has not yet been completely worked out. However, companies accounting for $2.1 billion of the anticipated $5.6 billion expenditures over the 5-year period have indicated that they expect to raise 35 per cent of the money from internal sources (depreciation, depletion, and retained earnings), 46 per cent from sale of bonds, and 19 per cent from preferred and/or common stock issues. The proportion of equity financing will apparently continue to run lower than for the electric utility industry.

FINANCIAL DATA ON ELECTRIC UTILITY STOCKS

1951 Rev. (Mill.)			7/9/52 Price About	Div. Rate	Current Yield	Share Earnings* Cur. Period	% Increase	Freq. Of Reports**	Price-Earns. Ratio	Div. Payout
$193	S	American Gas & Elec.	59	$3.00#	4.8%	$4.49my	1%	my	13.1	67%
22	O	Arizona Public Service ..	14	.80	5.7	.99my	27	qy	14.1	82
6	O	Arkansas Mo. Power ...	16½	1.00	6.1	1.23m	D13	qy	13.4	81
20	S	Atlantic City Elec.	26	1.35	5.2	1.72my	12	my	15.1	78
4	O	Bangor Hydro Elec.	28	1.60	5.7	2.10m	D10	qy	13.3	76
2	O	Beverly G. & E.	50	3.70	7.4	4.13d	31	a	12.1	97
3	O	Black Hills P. & L.	20	1.28	6.4	1.70a	D5	qy	11.8	75
74	B	Boston Edison	48	2.80	5.8	3.23m	4	qy	14.9	87
13	O	California Elec. Pr.	9	.60	6.7	.66m	8	qy	16.7	111
12	O	Calif. Oregon Pr.	27	1.60	5.9	1.81a	D5	b	14.9	88
40	S	Carolina P. & L.	36	2.00	5.6	2.80my	4	my	12.9	71
18	S	Cen. Hudson G. & E.	11	.70	6.4	.79m	22	qy	13.9	83
14	O	Central Ill. E. & G.	24	1.30	5.4	2.18m	D1	bq	11.0	60
22	S	Central Ill. Light	39	2.20	5.6	2.84my	D3	mcy	13.7	77
33	S	Central Ill. P. S.	19	1.20	6.3	1.47m	D8	qy	12.9	82
8	O	Cen. Louisiana Elec.	33	2.00	6.1	2.76m	NC	qy	12.0	72
24	O	Central Maine Power ...	18	1.20	6.7	1.48my	10	my	12.2	81
80	S	Central & S. W.	19	1.00	5.3	1.42m	6	qy	13.4	70
8	O	Central Vermont P. S. ..	12	.80	6.7	1.23my	37	my	9.8	65
77	S	Cincinnati G. & E.	39	2.00#	5.1	2.92m	5	qy	13.4	68
5	O	Citizens Utilities	10	.36#	6.6	.80m	21	qc	12.5	38
80	S	Cleveland Elec. Illum. ..	53	2.60	4.9	3.82m	7	qy	13.9	68
2	O	Colorado Cent. Power ..	17	1.00	5.9	1.37m	4	qc	12.4	73
31	S	Columbus & S. O. E. ..	23	1.40	6.1	2.04m	9	qy	11.3	69
281	S	Commonwealth Edison ..	32	1.80	5.6	2.03m	D7	qy	15.8	89
7	C	Community Pub. Ser. ...	17	.90	5.3	1.41m	14	qy	12.1	64
1	O	Concord Electric	35	2.40	6.9	2.52d	D5	a	13.9	95

1951 Rev. (Mill.)		(Continued)	7/9/52 Price About	Div. Rate	Current Yield	Share Earnings* Cur. Period	% Increase	Freq. Of Reports**	Price-Earns. Ratio	Div. Pay-out
48	O	Connecticut L. & P.	15	.88	5.9	.97my	1	mcy	15.5	91
16	O	Connecticut Power	36	2.25	6.3	2.30m	D11	qy	15.7	98
418	S	Consol. Edison	35	2.00	5.7	2.25m	1	qy	15.6	89
84	S	Consol. Gas of Balt.	27	1.40	5.2	1.62m	D9	qy	16.7	86
129	S	Consumers Power	36	2.00	5.6	2.67my	D1	mcy	13.5	75
49	S	Dayton P. & L.	35	2.00	5.7	2.63m	1	qy	13.3	76
23	S	Delaware P. & L.	24	1.20	5.0	1.64m	D17	qy	14.6	73
6	O	Derby G. & E.	21	1.40	6.7	1.45d	D30	qc	14.5	97
164	S	Detroit Edison	23	1.40	6.1	1.63my	D2	b	14.1	86
89	C	Duke Power	85	4.75	5.6	6.36m	D15	bq	13.4	75
7	O	El Paso Electric	22	1.20	5.5	1.82my	4	my	12.1	66
9	S	Empire Dist. Elec.	23	1.40	6.1	2.16m	10	qy	10.6	65
4	O	Fitchburg G. & E.	46	3.00	6.5	3.12d	D15	a	14.7	96
25	S	Florida Power Corp.	21	1.20	5.7	1.54a	NC	qy	13.6	78
55	S	Florida P. & L.	29	1.40	4.8	2.52m	3	qy	11.5	56
137	S	General Pub. Util.	23	1.40	6.1	1.88a	NC	qy	12.2	74
5	O	Green Mt. Power	18	1.20	6.7	1.82my	5	qy	9.9	66
33	S	Gulf States Util.	24	1.20	5.0	1.59my	3	my	15.1	75
18	C	Hartford E. L.	47	2.75	5.9	2.76m	D6	qy	17.0	100
4	O	Haverhill Electric	32	2.25	7.0	2.59d	D17	qc	12.4	93
41	S	Houston L. & P.	21	1.00	4.8	1.53my	19	my	13.7	65
17	S	Idaho Power	37	1.80	4.9	3.12m	22	qy	11.9	58
51	S	Illinois Power	38	2.20	5.8	2.73my	D4	b	13.9	81
31	S	Indianapolis P. & L.	36	2.00	5.6	3.33m	1	qy	10.8	60
15	S	Interstate Power	9½	.60	6.3	.86m	8	qy	11.0	70
16	O	Iowa Elec. L. & P.	16	.90	5.6	1.46my	D7	my	11.0	62
24	S	Iowa-Ill. G. & E.	26	1.80	6.9	2.14m	D12	qy	12.1	84
25	S	Iowa Power & Light	24	1.40	5.8	1.94m	6	bq	12.4	72
22	O	Iowa Pub. Service	23	1.40	6.1	1.83my	—	b	12.6	77
9	O	Iowa Southern Util.	17	1.20	7.1	1.19my	D13	b	14.3	101
36	S	Kansas City P. & L.	28	1.60	5.7	1.82my	3	b	15.4	88
16	O	Kansas Gas & Elec.	33	2.00	6.1	3.03my	D5	my	10.9	66
29	S	Kansas Pr. & Lt.	18	1.12	6.2	1.32m	D8	qy	13.6	85
27	O	Kentucky Utilities	16	1.00	6.3	1.47m	D2	qy	10.9	68
5	O	Lake Superior D. P.	27	1.80	6.7	2.73m	11	qy	9.9	66
6	O	Lawrence G. & E.	38	2.40	6.3	2.65d	D15	qc	14.3	91
53	S	Long Island Lighting ...	16	.90	5.6	1.28m	32	qy	12.5	70
35	S	Louisville G. & E.	37	1.80	4.9	3.15m	14	qy	11.7	57
6	O	Lowell Elec. Lt.	45	3.00	6.7	3.70d	D7	qc	12.2	91
8	O	Lynn G. & E.	28	1.60	5.7	1.56d	D26	a	17.9	103
6	O	Madison G. & E.	32	1.60	5.0	2.47d	7	q	13.0	65
3	C	Maine Public Service ...	17	1.20	7.1	1.54a	16	my	11.0	78
3	O	Michigan G. & E.	29	1.80	6.2	2.67m	9	qy	10.9	67
112	S	Middle South Util.	24	1.30	5.4	1.75my	11	qy	13.7	74
17	S	Minnesota P. & L.	35	2.20	6.3	3.12my	D8	my	11.2	71
1	O	Missouri Edison	10	.70	7.0	1.14m	D4	qy	8.8	61
6	C	Missouri P. S.	19	.90	4.7	1.56m	—	qc	12.2	58
5	O	Missouri Utilities	16	1.00	6.3	1.62d	13	qy	9.9	62
27	S	Montana Power	28	1.55	5.5	2.43a	D2	my	11.5	64
13	C	Mountain States Pr.	12	.84	7.0	1.22m	3	qy	9.8	69
105	S	New England Elec.	13	.90	6.9	1.33m	D1	qc	9.8	68
34	O	New England G. & E. ...	15	1.00	6.7	1.19my	10	b	12.6	84
38	O	New Orleans P. S.	41	2.25	5.5	2.58my	D9	my	15.9	87
2	O	Newport Elec.	29	2.00	6.9	2.32my	D19	my	12.5	86
57	S	N. Y. State E. & G.	33	1.90	5.8	2.26my	29	my	14.6	84
176	S	Niagara Mohawk	27	1.60	5.9	1.93m	24	qy	14.0	83
89	S	North American	22¾	1.20	5.3	1.33m	D8	qy	16.9	90
51	O	Northern Ind. P. S.	25	1.52	6.1	2.21my	D2	c	11.3	69
89	S	Northern States Pr.	11	.70	5.8	.91m	—	qy	12.1	77
8	O	Northwestern P. S.	12	.80	6.7	1.28m	—	qy	9.4	63
96	S	Ohio Edison	35	2.00	5.7	2.74my	1	mcy	12.8	73
29	S	Oklahoma G. & E.	25	1.40	5.6	1.78m	19	qy	14.0	79*
13	O	Otter Tail Power	22	1.50	6.8	1.66my	D22	c	13.3	90
279	S	Pacific G. & E.	35	2.00	5.7	2.31a	NC	bq	15.2	87

1951 Rev. (Mill.)		(Continued)	7/9/52 Price About	Div. Rate	Current Yield	Share Earnings* Cur. Period	% Increase	Freq. Of Reports**	Price-Earns. Ratio	Div. Pay-out
20	O	Pacific P. & L.	18	1.10	6.1	1.60my	26	my	11.3	69
85	S	Penn Power & Light	29	1.60	5.5	2.40my	17	my	12.1	67
7	C	Penn Water & Power	39	2.00	5.1	2.24d	—	qc	17.4	89
165	S	Phila. Elec.	30	1.50	5.0	2.13a	D4	qy	14.1	70
25	O	Portland Gen. Elec.	29	1.80	6.2	2.38my	5	c	12.2	76
43	S	Potomac Elec. Power	16	.90	5.6	1.24m	31	qy	12.9	73
49	S	Pub. Serv. of Colo.	30	1.40	4.7	2.15m	1	qy	14.0	65
201	S	Pub. Serv. E. & G.	26	1.60	6.2	2.11m	NC	qc	12.3	76
50	S	Pub. Serv. of Ind.	31	1.80	5.8	2.34my	12	c	13.2	77
17	O	Public Serv. of N. H.	25	1.80	7.2	1.83my	25	mcy	13.7	98
7	O	Public Serv. of N. M.	9	.56	6.2	.84d	5	qy	10.7	67
21	O	Puget Sound P. & L.	20	.80	4.0	1.59m	D15	my	12.6	60
38	S	Rochester G. & E.	36	2.24	6.2	2.63a	—	qy	13.7	85
8	O	Rockland L. & P.	11	.60	5.5	.68d	D3	b	16.2	88
29	O	San Diego G. & E.	14	.80	5.7	1.33my	17	b	10.5	60
11	S	Scranton Elec.	14½	1.00	6.9	1.05my	D11	my	13.8	95
5	O	Sierra Pacific Pr.	25	1.60	6.4	1.94my	D7	my	12.9	82
118	S	So. Calif. Edison	35	2.00	5.7	3.03m	11	qy	11.6	66
23	S	So. Carolina E. & G.	10	.60	6.0	.61my	22	mcy	16.4	98
4	O	Southern Colo. Pr.	11	.70	6.4	.89f	10	c	12.3	79
154	S	Southern Co.	14	.80	5.7	1.19my	21	my	11.8	67
11	S	So. Indiana G. & E.	23	1.50	6.5	1.95my	D10	mcy	11.8	77
2	O	Southwestern E. S.	13	.88	6.8	1.41f	8	—	9.2	63
23	O	Southwestern P. S.	19	1.12	5.9	1.38my	18	mcy	13.8	81
6	S	St. Joseph L. & P.	28	1.60	5.7	2.11m	5	qy	13.3	76
13	C	Tampa Elec.	40	2.40	6.0	3.11my	D4	my	12.9	77
82	S	Texas Utilities	39	1.68	4.3	2.80my	30	qy	13.9	60
31	S	Toledo Edison	11½	.70	6.1	.96m	1	qy	12.0	73
7	O	Tucson G. E. L. & P.	27	1.60	5.9	2.55m	18	bq	10.6	63
23	O	United Illum.	41	2.40	5.9	2.38d	D16	—	17.2	100
2	O	Upper Peninsula Pr.	16	1.20	7.5	1.44m	5	bq	11.1	83
24	S	Utah Power & Light	31	1.80	5.8	2.36my	D5	mcy	13.1	76
69	S	Virginia E. & P.	24	1.40	5.8	1.79my	8	mcy	13.4	78
18	O	Wash. Water Pr.	26WD	1.30	5.0	1.52a	22	my	17.1	86
100	S	West Penn Elec.	32	2.00	6.3	2.96my	7	c	10.8	68
54	O	West Penn Pr.	39	1.85	4.7	2.32m	D4	qy	16.8	80
8	O	Western Lt. & Tel.	25	1.60	6.4	2.18m	8	qy	11.5	73
19	O	Western Mass. Cos.	32	2.00	6.3	2.10d	D22	qc	15.2	95
73	S	Wisconsin E. P.	25	1.30	5.2	2.04m	D9	qy	12.3	64
26	O	Wisconsin P. & L.	19	1.12	5.9	1.66m	16	qy	11.4	67
		Averages			5.9%				13.0	77%
Canadian Companies††										
134	C	Brazilian Trac. L. & P.	11	1.00	9.1	2.47d	5	qc	4.5	40
15	C	Gatineau Power	18	1.20	6.7	1.30d	D11	qc	13.8	92
8	C	Quebec Power	18	1.00	5.6	1.17d	D11	qc	15.4	86
37	C	Shawinigan Water & Pr.	43	1.45	3.4	1.84d	D7	qc	23.4	79
16	C	Winnipeg Elec.	35	2.40	6.9	2.26d	D7	a	15.5	106

a—April, 1952. d—December, 1951. f—February, 1952. m—March, 1952. my—May, 1952. B—Boston exchange. C—Curb exchange. O—Over-counter or out-of-town exchange. S—New York Stock Exchange. D—Decrease. E—Estimated. NC—No comparable figures available. PF—*Pro forma*. WD—When delivered. *If additional common shares have been recently offered, earnings are adjusted to give effect to the offering. Percentage change is in the balance available for common stock. ††While these stocks are listed on the Curb, Canadian prices are used. (Curb prices are affected by exchange rates, etc.) #Stock dividend also paid in 1951. **The following symbols are used in this column to indicate the periods and frequency of earnings reports: a—Calendar year only. b—Twelve months only (reported monthly). bq—Twelve months only (reported quarterly). c—Cumulative months and twelve months. m—Month only. mc—Latest month and cumulative months. mcy—Latest month, cumulative months, and twelve months. mqy—Latest month, three months, and twelve months. my—Latest month and latest twelve months. q—Latest quarter only. qc—Quarters cumulatively. qy—Latest quarter plus last twelve months. x—The dividend pay-out ratio would be 74 per cent on the basis of budgeted earnings of $1.90 for the calendar year 1952.

What Others Think

Safeguarding the Rôle of Management

THE vital rôle of management in United States' economy and the necessity for safeguarding it was emphasized recently in the *New England Letter*, published by The First National Bank of Boston. The *Letter* noted the conclusions reached by many foreign experts who have come to the United States to find out why the American system seems to be so superior. "Almost without exception," the *Letter* commented, "their conclusion has been that it is because of the predominant rôle played by American management, which is chosen on the basis of competence to mobilize men, materials, and money into a profitable combination. Management in this country serves as the trustee for the common good, and generally is on the alert to adopt the more modern methods and processes, and to pass the benefits on to the consumer."

Summing up its philosophy of the American system, the *Letter* continued:

> Our economic system is so intricately and delicately adjusted that a thorough understanding of its workings is essential for effective operation. Subject only to reasonable regulation, its direction and control should continue in the experienced hands which have been responsible for our industrial greatness. It should not be unduly interfered with by government agencies, for unwise decisions or the adoption of unsound policies are almost certain to do irreparable harm.
>
> The job maker plays the most constructive rôle in our economy. Upon his willingness to take risks and assume responsibility for profitable operations depends the welfare of all. He should be rewarded commensurate with the risks involved and services rendered. He should be provided with a favorable climate in which to operate, and should not be harassed and harried at every turn, nor his prerogatives so interfered with that he cannot perform essential functions. . . .

THE *Letter* pointed to the seizure of the steel industry as an example of the government's placing itself in a position to usurp the rôle of management, particularly if it should proceed to saddle the companies with "exorbitant union demands."

"Under such a setup," the *Letter* commented, "the government, without being responsible for the financial success of the companies, assumes authority to distribute the companies' money in accordance with political dictates. Practically all that is left for management to do under these circumstances is to pay all the bills, including taxes, and absorb the losses."

The *Letter* noted that employee compensation paid out by American industry in 1951 was nineteen times the amount distributed in the form of dividends, the logical inference being that "in the aggregate the workers have far more at stake than the Capitalists in the preservation of American business enterprise. For that reason, they should be deeply concerned about the adoption of any policy that would 'kill the goose that lays the golden eggs.'"

Since the capitalistic system is dependent upon a broad distribution of income, the policies of labor should be in line with those forces that make for greater productivity. Self-interest requires labor organizations to avoid rules limiting output and apprenticeships, favoring "featherbedding" and slowdowns, or perpetuation of nonproductive employment.

WARNING against failure to check the steady encroachment upon the functions of management, if we are to avoid a planned economy, the *Letter* concluded:

> . . . When power is concentrated in a centralized authority that determines the economic, social, and political powers of a nation, then the system of checks and balances is scrapped, and mistakes that are made have a profound and far-reaching influence.

Avoidance of this state of affairs will depend to a large extent on the success we have in discovering a basis for co-operative action in areas of common interest, which the *New England Letter* believes to be more numerous than "the fringes of disagreement" among the various groups.

Administering the Public Authority

THE Port of New York Authority has long been recognized as an outstanding example of a government organization which recognizes the need for efficiency and economy. In the June issue of *Dun's Review,* the Port Authority's executive director, Austin J. Tobin, defines the proper management of a self-sustaining public authority containing pointers which might well be noted by private management.

The public authority has been called "the most important innovation in political organization and constitutional practice in our time." According to Austin, the most important aspect of its development "is the fact that it makes it possible to apply the techniques and efficiency of the best business management to the development, financing, and administration of large public enterprises."

He continues:

> . . . In its proper sense, the distinguishing marks of a true authority are its form as an independent corporate agency, its nonpolitical operation, its adaptability to a regional approach, the self-supporting character of its projects, and its reliance on revenues of those projects for its continuing operation.
>
> It is the sort of public authority that should be judged by the measure of its success or failure in providing the same type and quality of efficient management that is to be found in the best of our large private corporations . . .

Austin emphasizes the independent character of an authority, its principal purpose being to provide business efficiency, -responsible management, "and business continuity" in the operation of a self-supporting public works program.

"The effective modern authority," he writes, "makes available the techniques of good business administration and management to public enterprises. It places them on their own feet and puts them on their own responsibility. It frees them from political interference, bureaucracy, and red tape without divorcing them from public control."

THE test of a successful public authority, Austin continues, lies in how favorably its management compares with those of a well-managed corporation. He states:

> The character and responsibilities of the board of directors or commissioners of a public corporation approximate today's enlightened concept of the responsibilities of a directorate. Both types of director are responsible to the stockholders. They are trustees for the stockholders, and all of their policies, decisions, and actions must be in the interest of the stockholders.

The main difference, he explained, is that all people in the area served by the public corporation comprise its stockholders, but this is a difference that is more apparent than real. He goes on to comment that "today's concepts of the responsibilities of the directors of a large private enterprise include the ex-

pectation that the corporation's policies shall be in conformity with the general public interest."

Austin expressed the view that a public corporation's directors should "be willing to give the benefit of their judgment and experience gratis, both as a matter of public duty and for the satisfaction that comes from service. Men with a record of accomplishment in business, the professions, or in other public office, should serve as commissioners because of a desire to render a constructive public service, and not because of the attractiveness of any salary for that service."

DELEGATION by the board of directors of complete responsibility to a chief executive is another fundamental principle of sound corporate management, too often given lip service rather than real recognition, in Austin's opinion. "The chief executive of a public corporation," he declares, "must be charged with the same responsibility for executive action and administration that the president of a private corporation is."

Austin feels there is no reason why a public corporation should not recognize and bargain with responsible unions of their employees. He explains:

> Although the public corporation cannot recognize the right to strike, its employees, through their own organizations, can acquire a unity and an avenue of presentation of problems. This is helpful to them, and should be helpful both to the authority's management in bringing about desirable improvements in working conditions and in the ultimate effectiveness of the corporation itself.

Austin points out the more exacting nature of a public corporation's accounting than that of a private corporation, admitting that "some of our public authorities have not faced up" to their accounting and budgeting responsibilities. "I notice an increasing tendency," he comments, "on the part of public agencies to ignore capital and overhead costs, to treat net operating revenues as if they were earned surplus, and to pat themselves on the back accordingly." The Tennessee Valley Authority is a case in point.

"The TVA," Austin observes, "makes loud claims to being self-supporting and is widely acclaimed as such in most of the college textbooks on public administration. Yet, a large part of its capital costs are charged off to public service facilities and are not reflected at all in the costs of power production. . . . many public agencies have actually convinced themselves that they are really self-supporting, and that they make their internal decisions and formulate their basic policies on that assumption. From the standpoint of sound business administration this can be fatal."

IN the matter of a public relations program for a public corporation, Austin calls for "honesty without hoopla," a program "based on bread and not cheesecake." He emphasizes:

> Good government public relations is dependent entirely upon good performance. The public corporation must first do a job that the public can think well of and then intelligently and deftly call attention to it. . . . To function efficiently a public relations officer should be consulted before and not after the development of a critical problem that may result in adverse public reaction. He must work with the executive and other department heads on a policy level. . . .

As director of a public corporation with 13,000,000 stockholders, Austin believes that his type of self-supporting, nonpolitical organization "is in a position to set an example and take the leadership in the development of those high standards of public service and efficiency that are so woefully lacking in most government agencies today. The public authority has the freedom to develop ideas, to try out new business techniques, and to work within a framework of standards and ideals which afford every opportunity for setting that example and giving that leadership."

The March of Events

In General

Buchanan Reappointed

PRESIDENT Truman has given Thomas C. Buchanan an interim appointment to the Federal Power Commission. The President's action came shortly after Congress adjourned without taking action on Buchanan's nomination.

The Senate Interstate Commerce Committee had previously voted 9 to 4 not to report the nomination to the Senate.

Buchanan has been serving as chairman of the FPC since January 5, 1952, and will continue to serve as an interim appointee until the next Congress takes action on his appointment, that is, unless the President should call a special session and the Senate takes earlier action on his nomination for a new 6-year term. Buchanan's term on the FPC officially expired on June 22, 1952.

District of Columbia

Ten Per Cent Transit Earning

W. C. GILMAN, New York financial expert, testified in rate hearings before the public utilities commission in Washington, D. C., that the Capital Transit Company should earn not less than 10 per cent on its investment to maintain its credit and financial integrity.

In previous rate hearings involving the transit company, the commission has stated that a return of 6.5 per cent was not unreasonable. The company maintains that it has never earned even this reasonable rate specified by the commission. According to Gilman, the company has earned more than 5 per cent only once —last year—when earnings hit 5.7 per cent.

The company seeks to eliminate a weekly pass, costing $2.10, and to set fares at 17 cents cash with six tokens for 95 cents. It contends that fares have increased 52 per cent since 1939, while the consumer price index for Washington has jumped 85 per cent.

Idaho

Power Company Seeks Increase

THE Idaho Power Company has asked the state public utilities commission for an increase of approximately 11 per cent over rates now in effect.

T. E. Roach, president of the company, said Idaho Power is serving at rates substantially below the national average and that even with the adjustment farm service would still be 35 per cent below the national average. He pointed to the 12 voluntary rate reductions made by the company since 1934.

Roach stated that his company's taxes have increased by 230 per cent since 1940, wage rates by about 106 per cent, and the cost of materials by as much as 297 per cent. Under such conditions, he added, it is impossible for electric rates to remain at prewar levels.

He expressed confidence that his com-

pany's customers would agree that "we have done a good job in holding the line this long by absorbing inflationary costs while at the same time meeting unusual demands and maintaining a satisfactory standard of service."

Massachusetts

Utility Appeals Bill Defeated

THE Massachusetts Senate has killed a bill to disallow the hearing of new evidence in appeals to the courts from decisions of the State Department of Public Utilities. The proposal was designed to curb the state supreme judicial court's power to reverse decisions of the state commission in rate cases. It was the third time the Massachusetts legislature has refused to enact such legislation recommended by Governor Dever.

In an advisory opinion to the Massachusetts House of Representatives this year, the state supreme judicial court ruled that the measure would be unconstitutional unless amended to provide for retention by the court of authority to obtain new evidence by remanding the case to the commission. The measure was amended in this manner before it was passed by the house and sent to the senate. Proponents of the legislation had contended that utility companies, under present law, could obtain reversals of commission decisions by withholding facts and submitting them to the court.

Missouri

Expansion Figured in Rate Base

A UNIQUE decision handed down by the Missouri commission last May approved a rate increase asked by the Empire District Electric Company basing return on the anticipated investment, expenses, and depreciation of the company's 3-year expansion program.

In granting the company a $527,974 increase, the commission found that, although existing rates would yield a return of 5.39 per cent on average rate base as of last September, the company's $14,000,000 expansion program should enable it to earn an average return approximating 6.3 per cent over a reasonable period in the future.

The commission estimated the average plant in service during the 3-year period, plus working capital, with credit balances for depreciation reserve and contributions. It concluded from this that a return of 6.5 per cent on past operations and 6.3 per cent on future operations was necessary.

New Hampshire

State Fights Rate Boost

PREPARATIONS have been made by legal counsel for the state of New Hampshire and a group of Manchester industries to appeal to the state supreme court the decision of the public utilities commission granting the Public Service Company of New Hampshire an increase of $1,344,750 in permanent electric rates.

At the same time the high court may be asked to grant either an injunction against the Manchester power company—the state's largest—to prohibit from collecting revenue under its new rate schedule until legal proceedings are ended or to issue an order which would require the firm to rebate its customers, if the courts find the rates to be excessive. However, the commission denied a motion that the costs of an appeal be made a part of the case which leaves it to Governor Sherman Adams and his executive council to provide the funds. The company had asked for a $1,600,000 hike in rates. The $1,344,750 boost granted by the commission was made retroactive to last November.

New York

Safety Provisions Probed

THE public service commission of New York has launched a statewide probe of safety provisions used by utilities in the transmission of illuminating gas. The investigation stemmed from explosions that rocked Brighton, a Rochester suburb, in September, 1951. The blasts took three lives and destroyed 44 homes. The commission summoned 44 gas companies to the first hearing in Albany, July 23rd.

Commission Chairman Feinberg said that the investigation was "no indication that immediate danger exists on the facilities and systems of the companies providing gas service." According to the commission, a survey conducted by its engineers after the Brighton explosions showed that the construction, operation, and maintenance practices pertaining to safety measures, particularly between high-pressure and low-pressure systems, varied throughout the states.

Large Stock Issue

THE New York Telephone Company has been authorized by the state public service commission to issue 1,400,000 shares of common stock with an aggregate par value of $140,000,000. The proceeds from the new securities will be used to discharge an equal amount borrowed by the company to further its construction program. The New York company will sell the new securities to its parent, American Telephone and Telegraph Company.

According to testimony at hearings on the matter, the company installed more than 600,000 telephones between October 1, 1950, and May 31, 1952, and as of June 1st there were still 79,000 applicants waiting for installations.

Pennsylvania

Bell Rate Increase Request Fought

THE Pennsylvania Public Utilities Commission has been asked to dismiss a proposed $31,706,600 annual rate increase of the Bell Telephone Company of Pennsylvania if the company does not submit additional data. Pittsburgh's city solicitor requested the action after the company declined to produce a 5-year cost study requested by the commission's counsel last May. Bell submitted instead a study based on one-year cost figures.

Pittsburgh's solicitor called on the commission to order Bell to provide the 5-year figures "or not be permitted to continue its case." Bell's attorney countered that the job of providing the additional data would be "a burdensome, time-consuming, and expensive task" that would not produce anything relative to the case.

Washington

Utility Values at Record High

THE value of privately owned public utilities in the state of Washington has been set at an all time high of $501,815,230 by the state tax commission. The evaluation, made for 1952 tax purposes, was an increase of $23,771,790 over the final values fixed by the board of equalization for 1951 assessments.

The largest boost increased the evaluation of Pacific Power & Light Company properties $9,400,000 to a new 1952 total of $30,000,000. Most of the increase was due to the construction of a new dam. Second highest boost sent the evaluation of Pacific Telephone & Telegraph Company up $8,000,000 to a new total of $106,500,000.

Progress of Regulation

Increased Rates Not Permitted to Be Made Effective During Suspension Period

THE United States Court of Appeals for the Fourth Circuit upheld the action of the Federal Power Commission in refusing to make increased gas rates effective during the period in which they had been suspended pursuant to § 4(e) of the Natural Gas Act. The commission, it was pointed out, has no power to fix rates retroactively or to make reparation orders.

The Hope Natural Gas Company, in September, 1949, filed a new schedule of rates, materially increasing charges to five of its six wholesale customers. On October 31, 1949, the commission suspended the rates for a 5-month period as allowed by § 4(e). At the end of that period the rates went into effect under bond to guarantee a refund if rates ultimately should be approved at a lower level.

The commission finally disapproved the increased rates as filed but directed the filing of other rates permitting a smaller increase, making them effective as of April 1, 1950. The excess collected under bond was ordered refunded.

The company claimed that the rates should be made effective as of November 1, 1949, or at least as to March, 1950, deliveries. The commission said this claim was contrary to the provisions of § 4(e) that the operation of a proposed increased rate may be suspended for a 5-month period pending hearings and decision, and the provision for collection of increased rates under bond at the end of the 5-month period.

The court agreed with the commission, declaring that if the commission suspends a proposed new rate under § 4(e) and enters upon a hearing, it can make only such orders with respect thereto "as would be proper in a proceeding initiated after it had become effective," that is, a proceeding under § 5(a).

This section of the Natural Gas Act, the court noted, was taken bodily from the Interstate Commerce Act, and therefore the settled construction by the Interstate Commerce Commission should be followed under the rule that where provisions of one statute have been adopted by another, the interpretation which has been authoritatively placed upon the former applies also to the latter.

The constitutional guaranty against the enforcement of confiscatory rates, the court held further, does not require that rates ultimately found to be reasonable shall be applied during a suspension period.

A holding that certain rates may be allowed, said the court, does not mean that lower rates must be condemned as unreasonable and confiscatory, especially where they are continued in preservation of the status quo during a reasonable period of rate investigation.

The question whether it would be reasonable to put such rates in effect during the suspension period was said to be a matter for Congress and not for the commission or the courts. *Hope Nat. Gas Co. v. Federal Power Commission (CA4th) May 14, 1952.*

Temporary Electric Rate Increase Resulting in Excess Profits Tax Denied Approval

THE Maryland commission denied a gas and electric company's application for a temporary electric rate increase pending investigation of a proposed permanent rate increase. It concluded that no emergency existed requiring the temporary increase. In order to grant temporary relief it must be found that existing rates failed to yield a reasonable return and that a hearing will require more than ninety days of elapsed time.

If the proposed increase were granted, it would have the effect of requiring the company to pay an excess profits tax, practically all of which would be paid by the users of electricity. The commission did not believe that the testimony warranted the granting of any temporary increase which would have this result. It observed, however, that in establishing permanent rates it might well be that in order to insure a reasonable return, users of all types of service would have to pay rates sufficient to include an excess profits tax, if such a tax is applied to earnings beginning at a point below what the commission might establish as reasonable.

The company did not seek a gas rate increase. The natural gas business was new, was in a transitional stage, and would require vigorous promotional efforts to develop the anticipated growth on which present rates were established. A gas rate increase at this time might impair or destroy that ability to compete and, therefore, jeopardize favorable development now in progress.

The gas segment of the business was producing a substantially lower return than the electric segment. The commission did not believe that in a temporary rate case it would be proper to require users of electricity to bear the full brunt of the increase when there was such a difference in rates of return which those two branches of the business were earning. *Re Consolidated Gas, E. L. & Power Co. Case No. 5217, Order No. 49235, June 10, 1952.*

Increased Taxes and Labor Costs Force Telephone Rate Increase

THE North Carolina commission authorized a telephone rate increase to yield an annual return of 6.5 per cent. In doing so, the commission said that public interest requires that a utility be allowed sufficient earnings to keep it financially healthy, physically efficient, and forward looking in order that it may render adequate public service and continue to expand that service. On the other hand, the commission said, management and stockholders should appreciate the fact that a regulated utility rendering essential service under an exclusive franchise is not exposed to all the economic risks and hazards which ordinary private business must face at all times.

Evidence indicated that the company did not earn a fair return in the past year. Revenues did not keep pace with investments and the return declined more rapidly following the last rate increase than had been anticipated by the commission. This was attributed to several factors, such as the increased cost of labor and materials and the considerable increase in Federal corporate income taxes. It was pointed out that the company has made commendable progress in its improvement and expansion program and that these additional heavy expenditures have greatly increased the total investment.

Although recognizing its obligation to fix rates which will produce a fair and reasonable return, the commission held that it has no duty to raise rates so as to produce additional revenue necessarily sufficient to maintain any particular fixed and certain common stock dividend, after paying increased operating

costs, higher taxes, and crediting some to surplus. If the approved rates should not produce net income sufficient to maintain present dividends as well as to bolster the surplus balance, it was recommended that the annual dividend rate be reduced somewhat.

The commission deducted from the rate base the portion of telephone plant under construction on which interest had been capitalized. It pointed out that if this amount remained in the total net investment figure which was to be used as a rate base, the effect would be the allowance of a double return on that part of the property. *Re Carolina Teleph. & Teleg. Co. Docket No. P-7, Sub 14, May 14, 1952.*

Competitor Not Receiving Notice of Application for Permit May Appeal from Commission Order

A PROVISION in the Michigan law that any party to a cause before the commission may appeal is not, according to the Michigan Supreme Court, to be so narrowly construed as to deny to a real party in interest the right to appeal from a commission order, granted upon an application and hearing of which such interested party had no statutory notice, merely because he was not present or represented at the hearing before the commission. The court said:

> To so hold would run contrary to the intent and purpose of the entire act, which carefully guarantees to interested parties the right to notice, to hearing, and to make objections, redress being afforded thereunder by way of appeal. If the appeal provisions of § 20 are exclusive, as defendant Hawkins contends, but unavailable to one who was not present or represented before the commission, then, by the simple expediency of failing to give statutory notice, the rights of interested parties, competing carriers, sought to be protected by the act, could be subverted.

The court also held that competing carriers who did not have notice of the proceeding had a direct interest warranting intervention and, moreover, that the right of judicial review could not be terminated or defeated by the death of one of them. This party's widow, as administratrix of his estate, had been permitted to intervene in the lower court. *Koss (Frank H. Cass Co.) v. Public Service Commission (1952) — Mich —, 53 NW2d 491.*

Commission Refuses to Adopt NARUC Charleston Plan for Telephone Separations

THE Maine commission denied a telephone company a rate increase which would have increased its revenues by about $2,600,000. After modifying the company's rate base and separations figures, the commission determined that the company was already earning a 6.5 per cent return, which was considered adequate.

The commission refused to consider current costs in its determination of fair value for the reason that such costs move up and down with a frequency which cannot be equaled by changes in rates. The commission also observed that a current cost rate base presumes that the plant would be reproduced in terms of today's dollars exactly as it was built over a period of many years. When the company contended that "something in excess of average net investment was being allowed the Bell system in other jurisdictions," the commission reviewed the rate base findings in Bell cases in about fifteen jurisdictions. These cases indicated that, while Pennsylvania and New Mexico considered other matters, most of the state commissions limited

their consideration to net investment.

In making an allowance for working capital, the commission considered tax accruals available to the company prior to their due date and deposits made by customers in advance of their receiving service.

The commission questioned the company's method of determining the extent to which its plant is used for interstate and for intrastate service. It indicated that the company should have considered its business during the peak period of interstate use since its toll circuits were constructed to handle service during peak demand.

The commission considered at length the proper method of separating interstate and intrastate plant and expenses and discussed the NARUC Phoenix and Charleston plans, as well as the subscriber line usage method of separations.

The Charleston plan, which is the most recent modification of the NARUC Separations Manual, was not adopted. The commission said:

> We are not satisfied from the evidence presented that we should adopt the Charleston plan as it is not predicated on plant or operation of plant such as obtains in this jurisdiction. We understand what the answer is so far as Maine is concerned by using the Charleston plan but its applicability is quite a different matter and we have had none of the basic data involved presented to us.

Re New England Teleph. & Teleg. Co. F.C. No. 1370, May 19, 1952.

Federal Power Commission May Not Issue Retroactive Rate Orders

A United States District Court dismissed a natural gas company's action against a pipeline company to recover damages because the pipeline company refused to transport the company's gas at a reasonable and nondiscriminatory rate. The action was brought after the Federal Power Commission had determined that the pipeline company's rates were unjust, unreasonable, and discriminatory. The natural gas company asked the court to take judicial notice that the rates declared to be unlawful would have been unlawful in the period prior to the commission decision and during which the losses occurred.

The court held, in the first place, that the Federal Power Commission lacks power under the Natural Gas Act to make findings as to the reasonableness of past rates for transportation of natural gas.

Its jurisdiction to fix rates is limited to those to be thereafter observed and in force. The court accepted the proposition that the pipeline company's rates on file were the lawful rates until changed by the commission. Consequently, it concluded that the natural gas company could not show damage.

The action was held to have been barred by the statute of limitations also. The claimed losses occurred more than ten years prior to the bringing of this action. *McClellan et al. v. Montana-Dakota Utilities Co. 104 F Supp 46.*

Cities Similarly Situated Charged Same Natural Gas Rates

A natural gas company was authorized by the Kansas commission to increase rates in certain cities to the level of rates of the other cities on the same transmission system by placing them on the system's standard domestic rate. The rate concessions to the favored cities were considered discriminatory.

Years ago the favored cities were supplied with gas exclusively from nearby local fields. These sources of supply were cheaper and more easily accessible. Transmission charges were much less than those under current conditions. Now, however, the local supply of gas to the nearby cities is insufficient. The

adjacent fields are old and either virtually exhausted or rapidly nearing the stage of depletion.

The state commission concluded that with diminishing local production and higher costs, plus increasing transmission expenses, the cities should not be permitted to remain in a more advantageous position than other towns similarly situated.

The company was also authorized to increase industrial rates. The commission found that the old industrial rates were outmoded and designed for the day when the price of gas at the wellhead was considerably less than it is now. They were filed over twenty years ago. The commission believed that the old rates placed a burden on domestic consumers. It said that industry must pay its fair and proportionate share of the cost of industrial gas so that it will not be to the detriment and burden of the domestic users. *Re Kansas Power & Light Co. Docket No. 42,829-U, April 30, 1952.*

Electric Company Allowed to Recover Loss on Appliance Sales

THE New Hampshire commission disapproved an electric company's proposed rate increase although it did recognize the need for additional revenues. It was satisfied that the company would realize a net return of 5.92 per cent by making effective the fuel clause in one of its suspended tariffs and raising the existing tariff to recapture the money lost annually by a corrective downward readjustment of the fuel surcharge. The company was authorized to submit a new tariff designed to effect these results.

The commission took no issue with the company's claim that it should be allowed to recover a loss resulting from its appliance sales and service activities. These activities were considered an essential part of the company's promotional activity. The claimed loss was not deemed unreasonable in the light of the company's experience in attracting new business. For the same reason, the commission allowed the company's claim for appliance merchandise in the rate base. It refused, however, to allow merchandise accounts receivable as part of the rate base.

The commission accepted the company's policy of selling appliances to employees at a discount. But it said that the employees should pay all out-of-pocket costs, including all allocated handling charges. *Re Exeter & Hampton Electric Company, D-R3164, Order No. 6070, May 13, 1952.*

SEC Has Jurisdiction over Holding Company's Sale of Subsidiary's Stock to Utility Districts

THE United States Court of Appeals upheld the jurisdiction of the Securities and Exchange Commission over American Power & Light Company's sale of a subsidiary's common stock to public utility districts. The sale was proposed as a step to effectuate compliance with an order requiring dissolution of American Power & Light Company, a holding company. The court so ruled when it dismissed an appeal from the commission's order for a hearing on the proposed sale.

The appealing parties claimed that the sale was exempt from commission jurisdiction. In so asserting they relied upon § 2(c) of the Holding Company Act, which provides that "no provision in this title shall apply" to public utility districts. The court did not believe that § 2(c) could be made to carry so much weight. It said that, while the commission could not regulate what the districts might buy, it did have statutory jurisdiction to regulate what and how the holding company might sell.

The court observed that the Holding Company Act is replete with mandates to the commission that in respect to such a sale it shall issue such orders as it deems necessary or appropriate "in the public interest or for the protection of investors or consumers." It said:

> Whether the proposed sale is "susceptible of reasonably prompt consummation" is a consideration of vital importance to the investors who have their money in the enterprise, and whose possible interest in the alternative plan to distribute the stock should be a concern of the commission. The numerous problems posed by the notice relate to the interests of consumers in the areas served by Washington.
>
> We cannot think that anything said in § 2(c) can have the effect of ousting the commission of its necessary consideration of these matters merely because American chooses to attempt a sale to a state agency. The suggestion that § 2(c) cannot be given less than the force contended for by petitioners without violating the Tenth Amendment, is too wanting in substance to require discussion here.

The commission's order directing a hearing upon what it designated as a "declaration" with respect to the proposed sale was considered sufficiently final to warrant judicial review. *Public Utility Dist. No. 1 et al. v. Securities and Exchange Commission, 195 F2d 727.*

Demand Charge Instead of Service Restriction Approved to Conserve Water for Refrigeration

THE Arkansas commission denied an application by a water company for authority to limit the use of water furnished for air-conditioning and refrigeration units having a rated capacity of 5 tons or more. This proposal had been made to prevent the waste of water.

It was apparent that an over-all saving to the user of air-conditioning and refrigeration units could be realized by the installation of a cooling tower, and in view of the wasteful use of water in the absence of a cooling tower and the consequent overloading of facilities and supply, it was deemed proper that this seasonal load should bear its proportionate share in supporting a fair return on plant and any future expansion of facilities necessitated by the increasing load.

The most equitable way to accomplish this division of cost of service and to promote the conservation of water supply, said the commission, was to consider the addition of a rider to the present water rate schedule setting a demand charge on all users of air-conditioning equipment of 3 tons or more capacity using water as the cooling medium without recirculating the water through a cooling tower. The water company was directed to file such a rider providing for a demand charge per ton/month basis covering the usage of water used in such installations without cooling towers. *Re General Waterworks Corp. Docket No. U-732, June 11, 1952.*

Other Important Rulings

A FEDERAL district court held that the provision of the Administrative Procedure Act requiring that decisions, including initial, recommended, or tentative decisions, shall include a statement of findings and conclusions, as well as the reasons or basis therefor, on all the material issues of fact, law, or discretion, applied to the Interstate Commerce Commission. *Atlanta & S. A. Bay Railway Co. v. United States, 104 F Supp 193.*

The United States Court of Appeals held that a railroad tariff exception item,

entitled "Agricultural Implements and Other Articles," which provided for a charge of 40 per cent of the first-class rate and which listed "Engines, Steam, or Internal Combustion, N. O. I. B. N.," applied to shipments of aircraft, tank, and boat internal combustion engines not otherwise indexed by name; such engines being "other articles." *United States v. Missouri-Kansas-Texas R. Co. 194 F2d 777.*

The Pennsylvania commission held that a water company was not required to extend service, at its own expense, to a farmhouse where construction of 195 feet of service line would be required and would include tunneling or driving under a 30-foot highway, and where there was little likelihood of additional revenues resulting. *Eisenhuth v. Mifflintown Water Co. Complaint Docket No. 15078, May 26, 1952.*

The United States Court of Appeals held that the fact the detention of railroad cars is the result of accumulation of cars so great as to exceed the unloading capacity of the consignee is not such an unusual condition as will justify relief from the imposition of demurrage charges. *Froehling Supply Co. v. United States, 194 F2d 637.*

The Wisconsin commission held that it is reasonable for a telephone company to establish a gross rate to apply to bills for exchange service not paid after a specified date. *Re Kogonsa Independent Teleph. Co. 2-U-3742, April 1, 1952.*

The Wisconsin commission held that a dam, a transmission main, and a filtering plant used for stand-by purposes were properly included in a water company's rate base. *Re Peoples Water, Light & Power Co. 2-U-3762, June 16, 1952.*

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Public Utilities Reports (New Series) are published in five bound volumes a year, with the PUR Annual (Index). These Reports contain the cases preprinted in the issues of PUBLIC UTILITIES FORTNIGHTLY, as well as additional cases and digests of cases. The volumes are $7.50 each; the Annual (Index) $6.00. *Public Utilities Reports* also will subsequently contain in full or abstract form cases referred to in the foregoing pages of "Progress of Regulation."

PUBLIC UTILITIES REPORTS

UNITED STATES SUPREME COURT

Pennsylvania Water & Power Company et al.

v.

Federal Power Commission et al.

Nos. 428, 429
342 US —, 96 L ed —, 72 S Ct 843
May 26, 1952

CERTIORARI to United States Court of Appeals for the District of Columbia Circuit to review judgment approving rate reduction order of Federal Power Commission; affirmed. For Commission decision, see (1949) 8 FPC 1, 170, 82 PUR NS 193, 286; and for lower court decision, see (1951) — US App DC —, 94 PUR NS post, p. —, 193 F2d 230.

Rates, § 13 — Authority of Federal Power Commission — Licensee.

1. The Federal Power Commission has authority to regulate rates of an electric company as a public utility under Part II of the Federal Power Act even though the company is a licensee under Part I of the act, p. 3.

Interstate commerce, § 79 — Jurisdiction of Federal Power Commission — Rates of licensed company — Inability of states to agree.

2. A power company licensed under the Federal Power Act is subject to rate regulation by the Federal Power Commission under Part I of the act when the states involved are unable to agree within the meaning of § 20 of Part I of the act, p. 3.

Interstate commerce, § 22 — What constitutes — Integrated electric system.

3. Sales of the output of an integrated and co-ordinated interstate electric system are in interstate commerce, and therefore subject to Federal regulation under Part II of the Federal Power Act, when the operations of the unified system are completely interstate in character, notwithstanding the

fact that system energy transactions at some particular times may involve energy never crossing the state boundary by reason of the fact that the direction of energy flows crossing a state line are governed by the volume of river flow and needs of consumers in adjoining states, p. 4.

Rates, § 652 — Order of Federal Power Commission — Effect of illegal contractual agreements.

4. An order of the Federal Power Commission requiring a wholesale electric company to reduce rates to a distributing company, although involving the continuance of service which has been supplied under intercompany contracts found to be illegal, is not subject to attack on the ground that the order and Commission findings are premised on the continuation of such contract, since the duty to continue co-ordinated operations springs from the Commission authority and not from the law of private contracts, p. 5.

(DOUGLAS and REED, JJ., dissent.)

APPEARANCES: Wilkie Bushby, of New York city, argued the cause for petitioners, Pennsylvania Water & Power Co. et al.; William J. Grove, of Norristown, Pennsylvania, argued the cause for petitioner, Pennsylvania Public Utility Commission; Solicitor General Perlman, of Washington, D. C., argued the cause for respondent, Federal Power Commission; Alfred Ramsey, of Baltimore, Maryland, argued the cause for respondent, Consolidated Gas Electric Light & Power Co. of Baltimore; Charles D. Harris, of Baltimore, Maryland, argued the cause for respondent, Public Service Commission of Maryland.

Mr. Justice BLACK delivered the opinion of the court: In 1944 the Maryland Public Service Commission, the mayor and council of the city of Baltimore, the Baltimore county commissioners, and several private purchasers of electric power decided to ask the Federal Power Commission for help. They requested the Commission to investigate allegedly "excessive rates" the Pennsylvania Water & Power Company (Penn Water)[1] was charging Consolidated Gas Electric Light and Power Company of Baltimore (Consolidated). The Maryland interests wanted the Federal Power Commission to reduce these charges so that the state Commission could lower Consolidated's rates to its Maryland customers. The Federal Commission held many months of extensive hearings and found that Penn Water had charged its customers almost three times what it should have in 1946. In this year it had a net operating income of $3,477,408, as contrasted with $1,300,672 which the Commission found would have been a fair return (5¼ per cent) on a fair rate base ($24,774,712), allowing Penn Water "about 8.64 per cent for common stock and surplus, which is adequate."[2] The Commission ordered Penn Water to file a new schedule of rates and charges to bring about the reductions required.

In subsequent orders the Commis-

[1] Penn Water, as used in this opinion, refers to both Pennsylvania Water & Power Company and its wholly owned affiliate, Susquehanna Transmission Company of Maryland.

[2] There was evidence before the Commission that from 1936 through 1945 Penn Water's dividends on its common stock had never been less than 25 per cent of the cash paid in on the stock.

sion denied Penn Water's applications for rehearing, rejected as insufficient new rate schedules filed by Penn Water, and itself prescribed the rate schedules which Penn Water here seeks to avoid. On review the court of appeals gave full consideration to Penn Water's multitudinous challenges and approved the Commission's action, one judge dissenting. (1951) — US App DC —, 94 PUR NS post, p. —, 193 F2d 230.

Most of the numerous questions presented and decided by the Commission and the court of appeals are not presented here by the petitions for certiorari which we granted.[3] We are not called on to review the adequacy of the evidence to support the Commission's findings as to a fair rate base, a fair rate of return, or any other findings except in so far as our decision of several rather general questions presented might indirectly undermine some of them. The questions we must decide are in general these:

(1) Does the fact that Penn Water is a licensee under Part I of the Federal Power Act,[4] and therefore subject to regulation under that part, preclude its regulation under Part II of the act as a public utility engaged in interstate commerce?

(2) Assuming that Penn Water can be subjected to regulation under both parts of the act, were the Commission and the court of appeals correct in holding that all of Penn Water's sales at wholesale were "in interstate commerce" within the meaning of Part II of the act?

(3) Does the Commission's rate reduction action compel the continuance of, or is it improperly based upon, contractual agreements between Penn Water and Consolidated which Penn Water cannot carry out without violating the Federal antitrust laws or the laws of Pennsylvania forbidding surrender by Pennsylvania corporations of their corporate independence?

I.

[1, 2] Although Penn Water is the type of "public utility" subject to regulation under Part II of the act, it argues that since it is subject to regulation under Part I as a licensee, it cannot be regulated under Part II as a public utility. We cannot agree. With some express exceptions not here relevant, the language of Part II of the act makes all "public utilities" subject to the regulation it prescribes. No reason has been advanced which could possibly justify a judicial exception to this statutory command. A major purpose of the whole act is to protect power consumers against excessive prices.[5] Part I leaves regulation to the states under some circumstances. But, under § 20 of Part I the Federal government is to protect the consumer if a state regulatory body does not exist or the "states are unable to agree . . . on the services to be rendered or on the rates or charges of payment therefor. . . ." Part II proceeds on the assumption that regulation of public utilities transmitting and selling power at wholesale in interstate commerce is a matter which must

[3] 342 US 931, 96 L ed —, 72 S Ct ante, p. 375.

[4] 41 Stat 1063, 49 Stat 838, 16 USCA, § 791a et seq.

[5] Section 20 of Part I provides that "the rates charged and the service rendered . . . shall be reasonable, nondiscriminatory, and just to the customer . . . ." Section 205 (a) of Part II, 16 USCA § 824d (a), provides that "All rates and charges . . . shall be just and reasonable . . . ."

be accomplished by the Federal Government. Part II therefore provides for a more expansive federal regulation than that authorized under Part I. It would hinder, not help, the Power Act's program if we should impliedly exempt Part I licensees from the more expansive Part II regulation. It may be possible that some future cases will develop minor inconsistencies in the administration of the two parts. Today's case, however, is not such a one. We hold that Penn Water is subject to regulation under Part II of the act. It is also subject to Part I regulation since the Commission found on substantial evidence, as the court below held, that the states were "unable to agree" within the meaning of § 20 of Part I of the act.

II.

[3] It is contended that some of Penn Water's sales at wholesale were not "in interestate commerce" and therefore were not subject to Federal regulation under Part II. This contention refers to sales made by Penn Water in Pennsylvania to Pennsylvania customers. These are alleged to constitute about 83 per cent of Penn Water's total business. Because of the following circumstances we agree with the Commission and the court of appeals that these sales were "in interstate commerce."

Penn Water and Safe Harbor Water Power Corporation (Safe Harbor) have hydrogenerating plants on the Susquehanna river in Pennsylvania. Consolidated operates large steam-generating plants in Baltimore. The flow of the Susquehanna varies greatly even from day to day. During periods of low flow, Penn Water receives steam-generated energy from Baltimore in order to meet its power supply commitments. Conversely, during periods of high flow, Consolidated is able to receive the cheaper hydro-power from Penn Water and Safe Harbor. For many years Penn Water, Consolidated, and Safe Harbor have been operating under contracts for the co-ordinated sale and distribution of electric power in Maryland and Pennsylvania. A complete integration and pooling of the power producing and transmitting facilities of the three companies was thus achieved. With reference to this co-ordinated system of production and distribution, the Commission said:

"The central fact disclosed by the record about Penn Water's sales in Pennsylvania is that they are not sales of the output of Penn Water's own plant, but sales of output of the integrated and co-ordinated interstate electric system of which Penn Water's facilities are an integral part. . . .

"In this manner energy crossing the state boundary, with other system energy, is used to fulfill system requirements. There result times when system energy generated in Pennsylvania is used, mixed or unmixed, in meeting system requirements in Maryland. Similarly, there are occasions when system energy from Maryland is used, mixed or unmixed, in meeting system requirements in Pennsylvania. Energy flows in, across, and out of the system transmission network as the needs of the interconnected members develop from minute to minute and day to day.

"It is accordingly evident that the operations of the unified system enterprise are completely interstate in char-

acter, notwithstanding the fact that system energy transactions at some particular times may involve energy never crossing the state boundary." 8 FPC 1, 12, 15, 82 PUR NS 193, 208, 211.

We hold that the Federal Power Commission has complete authority to to regulate all of this commingled power flow.[6] The Commission's power does not vary with the rise and fall of the Susquehanna river.

III.

[4] Penn Water contends that the Commission's orders improperly require it to continue performing an illegal contract and that continued performance of this contract is the basis for some of the Commission's findings. This contract allegedly requires Penn Water to subject the management of its business affairs to the domination of Consolidated and for this reason violates the Federal antitrust and corporation laws of Pennsylvania under which Penn Water is incorporated. In private litigation, the court of appeals for the fourth circuit has agreed with Penn Water that certain provisions of the contract are illegal for the reasons stated. Viewing these provisions as inseparable, that court held the entire contract unenforceable.[7]

We need not now decide the question much argued here concerning what, if any, power the Commission has to rely on or to compel parties to carry out private contracts which would otherwise be illegal; the Commission has not attempted to exercise such power in this case. It is true that Penn Water must continue to do some of the things it used to do in compliance with the Penn Water-Consolidated contract. For under the present schedules prescribed by the Commission's order Penn Water must continue to buy, sell, and transmit power in the same co-ordinated manner in which it and Consolidated have been functioning for more than twenty years. But the Commission's order, as construed by the Commission, by the court of appeals and by us, neither expressly nor impliedly requires Penn Water to yield to any contractual terms subjecting it to the control of Consolidated. In the highly unlikely event that Penn Water's managerial freedom is ever threatened by such an order, it will be time enough to consider its validity. To the extent that Penn Water is being controlled, it is by the Commission, acting under statutory authority, not by Consolidated, acting under the authority of private contract terms "legalized" by the Commission. The duty of Penn Water to continue its co-ordinated operations with Consolidated springs from the Commission's authority, not from the law of private contracts.

Nor has the Commission premised any of its findings upon the assumed existence and continuation of this contract. Penn Water first made this contention to the Commission in seeking a rehearing of the Commission's order directing a reduction in its rates. At that time the Commission fully re-

[6] See also Safe Harbor Water Power Corp. v. Federal Power Commission (1949) 84 PUR NS 344, 179 F2d 179, affg (1946) 5 FPC 221, 66 PUR NS 212.

[7] Pennsylvania Water & Power Co. v. Consolidated Gas, E. L. & Power Co. (1950) 86 PUR NS 33, 184 F2d 552. See also Consolidated Gas E. L. & Power Co. v. Pennsylvania Water & Power Co. (1952) 194 F2d 89.

examined its former opinion, findings, and orders, modified some and reaffirmed and strengthened others, and expressly stated that the validity of its order was not dependent upon the legality of the contract. It said: "If there are questions as to legality of the foundation contracts which are in litigation, as respondents' application for rehearing indicates, the validity of our order is not dependent upon the decision of those questions." 8 FPC 170, 175, 82 PUR NS 286, 291. We agree with the court of appeals that neither the order nor the findings were premised on the continuation of the Penn Water-Consolidated contract.

The act gives the Commission ample statutory power to order Penn Water and Consolidated to continue their long-existing operational "practice" of integrating their power output. Section 206, 16 USCA § 824e, provides that "Whenever the Commission, after a hearing . . . shall find that any rate . . . is unjust, unreasonable . . . the Commission shall determine the just and reasonable rate, . . . practice, or contract to be thereafter observed and in force, and shall fix the same by order." In ordering such "practice" continued, the Commission was furthering the expressly declared policy of the act. Moreover, the Commission found here ready-made by prior contractual arrangements a regional co-ordination of power facilities of precisely the type which the Commission is authorized to require under § 202. Section 202(a), 16 USCA § 824a(a), declares:

"For the purpose of assuring an abundant supply of electric energy throughout the United States with the greatest possible economy and with regard to the proper utilization and conservation of natural resources, the Commission is empowered and directed to divide the country into regional districts for the voluntary interconnection and co-ordination of facilities for the generation, transmission, and sale of electric energy, ..."

The Commission was further directed in that section to "promote and encourage" such interconnection and co-ordination. Under certain circumstances § 202(b) authorizes the Commission to compel interconnection and co-ordination in the public interest, and to "prescribe the terms and conditions of the arrangement to be made between the persons affected by any such order, including the apportionment of cost between them and the compensation or reimbursement reasonably due to any of them."

If Penn Water wishes to discontinue some or all of the services it has rendered for the past twenty years, the act, as the Commission pointed out, opens up a way provided Penn Water can prove that its wishes are consistent with the public interest. Shortly after Part II of the Power Act was passed in 1935, Penn Water, as required by § 205(c), filed with the Commission the contract here attacked and then designated by the Commission as "Penn Water's Federal Power Commission Rate Schedule No. 1." Section 205(d) provides that "no change shall be made by any public utility in any such . . . service . . . or contract relating thereto, except after thirty days' notice to the Commission and to the public." Here instead of following the procedure for changing existing services and practices—a procedure which the Congress

has authorized and which the Commission has supplemented by rules of its own, the company has rather tried to utilize a violation of the Sherman Act so as to nullify a rate-reduction order.

Nothing whatever has been presented by Penn Water to show that the end result of this rate reduction is unjust or unreasonable. Cf. Federal Power Commission v. Hope Nat. Gas Co. (1944) 320 US 591, 603, 88 L ed 333, 345, 51 PUR NS 193, 200, 64 S Ct 281.

Affirmed.

Mr. Justice Frankfurter, not having heard the argument, owing to illness, took no part in the disposition of these cases.

Mr. Justice DOUGLAS, with whom Mr. Justice REED concurs, dissenting:

There is more to these cases than meets the eye. On the surface they seem to be only an illustration of the exploitation of the public by a utility through the charging of excessive rates. But far greater issues lurk in the record. There is lawless conduct that overshadows the evils of extortionate rates. It is lawless conduct that violates the Sherman Act. It implicates not only the utilities but the regulatory agency as well. The desire to reduce excessive rates should not blind us to the greater evil. It is far better that one public utility win one more legal skirmish in its struggle against regulation, than that we abandon legal standards and let the regulatory agency run riot.

We start here with the exploitation of the public through an unholy alliance between two public utility companies—Penn Water and Consolidated. That alliance has been condemned by the court of appeals for the fourth circuit. See (1950) 86 PUR NS 33, 184 F2d 552; (1952) 194 F2d 89. The alliance was illegal because it violated the Sherman Act. It was an arrangement that permitted Penn Water to be operated as though it were a department of Consolidated. All competition between the two companies was destroyed, as evidenced by the fact that in 1948 Consolidated vetoed a steam electric generating plant to be built by Penn Water at Holtwood, Pennsylvania. What Penn Water may do, the revenues it receives, the costs it will incur are largely determined by Consolidated under these illegal contracts.

The Commission in its opinion on rehearing said: "If there are questions as to the legality of the foundation contracts which are in litigation, as respondents' application for rehearing indicates, the validity of our order is not dependent upon the decision of those questions. In our opinion and order we took care to leave the continuation of the operation of the integrated and interconnected system *in full effect,* merely changing the rates, ..." 8 FPC 170, 175, 82 PUR NS 286, 291. (Italics added.) The Commission has accordingly approved the unholy alliance. It has allowed Consolidated to continue to manage Penn Water as though the latter were its alter ego. It is therefore disingenuous for the Court to say that hereafter Penn Water is subject to control by the Commission, not by Consolidated, and that the Commission did not premise any of its findings on the assumed existence and continuation

of the illegal contracts.[1] No matter how vehement our denial, the truth is that the Commission has laced Penn Water to Consolidated under a management contract that leaves Penn Water no initiative of private management.

Of course the Commission has authority under § 202 of the Federal Power Act to promote and at times compel interconnection and co-ordination of the facilities of public utility companies. But I know of no power in the Commission that authorizes it to place one company on the back of another company, to merge and consolidate companies as it chooses, or to give the management of one company a veto power over the management of a competitor. Those are practices which the Sherman Act condemns, and which nothing in the Federal Power Act sanctions.

These cases should be reversed and remanded to the Commission with directions that the Commission build its rate order on the powers that it has under the Federal Power Act, not on the unholy alliance that these utilities created and that the Commission has sought to perpetuate.

[1] The Commission entered its final order in the cases prior to the decision of the court of appeals in the Sherman Act litigation. The Commission opinion on rehearing was dated February 28, 1949, 82 PUR NS 286, while the first decision of the court of appeals was on September 30, 1950, 86 PUR NS 33, 184 F2d 552.

MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES

Re Brockton Gas Light Company et al.

D.P.U. 9674
February 25, 1952

APPLICATION *for approval of merger of two gas companies and issuance of securities under the merger plan; granted.*

Security issues, § 105 — Dividend and interest requirements — Merger plan.

1. Dividend and interest requirements of about 4.5 per cent on the net investment of a gas plant on securities to be issued by a gas company pursuant to a merger plan were considered consistent with the public interest, p. 11.

Consolidation, merger, and sale, § 47 — Imposition of conditions — Freezing of surplus — Dividend restrictions.

2. The Department, in authorizing the merger of two gas companies, required that the surplus which had been invested in used and useful plant should be frozen, rather than treated as free surplus, and carried in Account 324, Surplus Invested in Plant, so that it would not be available for declaration of dividends, p. 11.

Consolidation, merger, and sale, § 22 — Effect on depreciation reserves.

3. The merger of a gas company having a depreciation reserve of only 20.22

per cent of its depreciable property with another gas company having a depreciation reserve of 47.84 per cent of its depreciable property was considered financially beneficial, where the consolidation of the two balance sheets, before elimination of duplicating and unnecessary plant, reflected a depreciation reserve of 31.48 per cent of depreciable plant, an amount more nearly in line with realities and comparable to that accrued by other operating companies, p. 12.

Consolidation, merger, and sale, § 19 — Basis for approval — Public interest — Service benefits.

4. The merger of two gas companies was authorized as being in the public interest where the resultant company would be able to finance a conversion to natural gas, whereas the individual companies, before merger, were unable to do so; where the conversion would result in savings for consumers; where the larger load of purchased gas resulting from the merger would enable the resultant company to control more advantageously its load factor and to develop the possible market for house heating in the area; where it would enable the merged company to handle peak shaving and emergency loads more efficiently; and where, if one company were to purchase the assets of the other company in lieu of the merger, it would be required to sell new securities in the open market, entailing great expense, and would involve its stockholders in grave tax problems, p. 12.

APPEARANCES: Gerald May, for Brockton Gas Light Company; Walter G. Powers, for Taunton Gas Light Co.; W. A. Hill, for North Attleboro Gas Company; Jarvis Hunt, for certain customers of North Attleboro Gas Company.

By the DEPARTMENT: Brockton Gas Light Company and Taunton Gas Light Company filed with the Department on August 13, 1951, pursuant to the provisions of Chap 164 of the General Laws, as amended, a joint petition for approval of the merger of the two companies in accordance with the terms of a written agreement filed with the petition. Approval is also requested by Brockton Gas Light Company to the issuance of 20,356 shares of $50 par value cumulative preferred stock or an aggregate par value of $1,017,800, said preferred stock to be exchanged for the outstanding capital stock of Taunton Gas Light Company, and to the issuance of its 3½ per cent notes in the principal amount of $595,000, due August 1, 1959, for the purpose of refunding a like amount of 2¾ per cent Taunton notes due August 1, 1957. Certified copies of the votes of the stockholders were filed with the petition in conformity with the General Laws. After due notice, the Department held a public hearing on this petition on October 3, 1951.

The Brockton Company served 29,551 customers' meters in the city of Brockton and nineteen surrounding towns on December 31, 1950, supplied in bulk the gas requirements of the Norwood Gas Company and Plymouth Gas Light Company. As of the same date, the Taunton Company served 23,070 customers' meters in the cities of Taunton and Attleboro and thirteen surrounding towns. The Taunton Company also supplies in bulk the gas requirements of the North Attleboro Gas Company and the municipal plant of the town of Middle-

boro. Brockton intends to perform the contracts for such bulk supply in place of Taunton, at least until natural gas becomes available, and such contracts will be enforced by the Department. See Gen Laws, Chap 164, § 92A. The territories served by the Brockton and Taunton companies are adjacent to each other.

At the Brockton stockholders' meeting on the petition to merge, the holders of 83.7 per cent of the outstanding stock voted for the merger, and at the meeting of the Taunton stockholders 83.4 per cent voted for the merger with Brockton. No stockholders of either company voted against the merger.

Taunton Gas Light Company reported a plant investment of $4,074,-012 as of December 31, 1950, and a depreciation reserve accrued thereon of $1,888,786. Outstanding capital stock consists of 14,540 shares of $50 par value common stock, or an aggregate par value of $727,000. Premiums totaling $319,500 have been paid in on said stock. The surplus as of December 31, 1950, was reported at $643,859.

Brockton Gas Light Company reports a plant investment of $5,582,779 at December 31, 1950, with a depreciation reserve accrued thereon of $1,130,186. Stock outstanding consists of 298,145 shares of $10 par value common stock aggregating $2,981,-450 (D. P. U. 9632). The surplus account was reported at $695,262.

It is proposed under the merger agreement that Brockton issue 20,356 shares of $50 par value cumulative preferred stock, with a dividend rate of $3.80 per annum, to be exchanged on the basis of 1.4 shares for each share of Taunton stock. In the event of liquidation, the preferred stock is to have a liquidating value of $81.50 per share plus accumulated dividends, and in the event of call by Brockton, the preferred is to have a call price of $83 per share plus accumulated dividends, with Brockton retaining the right to call any part or all of said issue at any time. The preferred holders will be entitled to elect one-third of the members of Brockton's board of directors in the event of default in the payment of four dividends while the default continues.

The capital stock, premium, and surplus of Taunton totaled $1,690,-358.89 as of December 31, 1950. The preferred stock which Brockton proposes to issue in exchange for the Taunton stock has an aggregate par value of $1,017,800, an aggregate liquidating value of $1,659,014, and an aggregate call value of $1,689,548. Thus the Brockton preferred stock, in the event of liquidation or call, would substantially represent the book value, i.e., the aggregate of the stock, premium, and surplus accounts, of the Taunton common stock. The proposed dividend rate of $3.80 per share on the preferred stock would be equivalent to a return of approximately 4½ per cent on such book value.

Taunton Gas Light Company has outstanding $595,000 of 2¾ per cent notes due August 1, 1957, held by the Massachusetts Mutual Life Insurance Company (D. P. U. 7761). The loan agreement dated July 21, 1947, has a provision that Taunton cannot merge or consolidate with any other gas company without the consent of the insurance company. An agreement dated July 27, 1951, has been entered into by Brockton with the insurance com-

pany, under the terms of which the latter consents to the merger and agrees to the funding of the Taunton notes by an issue by Brockton of $595,000 principal amount of notes, to be dated August 1, 1951, and to mature August 1, 1959, at an interest rate of 3½ per cent per annum. The agreement is substantially the same as the Taunton agreement except for the change from 2¾ per cent to 3½ per cent in the interest rate and except that payments to be made by the Taunton Company under the original agreement on account of principal due August 1, 1951, and August 1, 1952, are under the terms of the new agreement, deferred until August 1, 1957, and August 1, 1958, respectively. It appears that Massachusetts Mutual Life Insurance Company intends to acquire the Brockton notes for its own account and has no present intention of distributing or reselling the notes.

Section 96 of Chap 164 of the General Laws, as amended, provides that a merger such as is here proposed may be accomplished, provided that "the Department, after notice and a public hearing, has determined that such purchase and sale or consolidation or merger, *and the terms thereof*, are consistent with the public interest." (Emphasis ours.) Section 14 of Chap 164, as definitively construed by the supreme judicial court in Lowell Gas Light Co. v. Department of Public Utilities (1946) 319 Mass 46, 62 PUR NS 238, 64 NE2d 640, requires us to investigate not only whether the amount of securities to be issued is reasonably necessary but also whether the purpose for which the securities are to be issued is reasonably necessary. Accordingly, we must inquire what the net effect would be of the approval of this proposal upon the public interest, both as to the terms of the proposed merger and as to the amount and purpose of the contemplated new issue of Brockton securities.

[1, 2] The par value of the new Brockton preferred stock to be issued is substantially equivalent to the par value of the stock plus premium account of the Taunton Company. The annual preferred stock dividend requirement of the Brockton Company after the issuance of the securities would total $77,352.80. Since 1939, Taunton has paid an 8 per cent annual dividend on par ($4 per share) or a total requirement for such common dividends of $58,160. This dividend on par and premium is at the rate of 5.5 per cent. As hereinbefore shown, Taunton has a surplus account of over $640,000 which it appears has been invested in the gas plant to a large extent. We are aware of the fact that this surplus is the property of the stockholders (Fall River Gas Works Co. v. Gas & E. L. Comrs. [1913] 214 Mass 529, 102 NE 475) and that when such surplus is invested in used and useful plant, the stockholders are entitled to have such plant considered in the rate base (Lowell Gas Co. v. Department of Public Utilities [1949] 324 Mass 80, 78 PUR NS 506, 84 NE2d 811; New England Teleph. & Teleg. Co. v. Department of Public Utilities [1951] 327 Mass 81, 88 PUR NS 73, 97 NE2d 509). The net plant investment of the Taunton Company approximates $2,200,000 and the total dividend and interest requirement on the securities to be issued by Brockton is less than $100,000 or about 4.5

per cent on the net investment. The over-all cost of the return on capital investment is not inconsistent with the public interest. The unusually high call premium of the proposed issue of preferred stock is such that it is inconceivable that the preferred issue will ever be called and retired. The call price undoubtedly was set to protect the equity of the Taunton stockholder and the Department is of the opinion that the surplus of the Taunton Company at the date of the merger should not be considered as free surplus but should be frozen, and we are providing as a condition of approval of the merger that said surplus be carried in Account 324, Surplus Invested in Plant, so that it will not be available for declaration of dividends.

[3, 4] At the hearing it was testified that certain advantages would result immediately from the consolidation and that estimated annual savings of $15,520 would result from elimination of directors' fees and certain officers' salaries, of duplication of auditors' reports and insurance coverage, and in the reduction of inventories and the consolidation of accounting work. It was also estimated future additional savings would approximate $5,000. It was further testified that, if and when the companies converted to the use of natural gas, further savings would result through the use of one co-ordinator and one company's purging equipment.

The Taunton Company has benefited over the years by conservative management. The advantages to be gained in its area by the merger are principally incident to the increased size of the merged company. The Brockton Company has not been so fortunate. As of December 30, 1950, Brockton's depreciation reserve represented only 20.22 per cent of its depreciable property, while Taunton had accrued a similar reserve of 47.84 per cent. The Brockton figure is comparatively low, and has been the source of some concern to the Department for many years. On the other hand, the Taunton reserve is comparatively high. The consolidation of the two balance sheets, before elimination of duplicating and unnecessary plant, shows a depreciation reserve of 31.48 per cent of depreciable plant, which seems more nearly in line with realities and is comparable to that accrued by other operating companies. In our opinion, the merged company will be in a strong financial position from this point of view.

The Taunton Company took the position, before the Federal Power Commission and at the instant hearing, that it intended to avoid the costs of conversion to straight natural gas when and if it becomes available, and to mix manufactured gas with the natural gas at a lower BTU content. This course of action was proposed because Taunton felt itself unable to finance such conversion costs. After the proposed merger, the resultant company intends to convert the entire area to the high BTU gas. The merged company will be able to finance such change without any trouble. It was estimated that such change would save the consumers of the Taunton area about $160,000 a year in costs of gas. It is expected that natural gas will be available to this area in the late summer of 1952. The larger load of purchased gas resulting from the contemplated merger will enable the

merged company to control more advantageously its load factor and to develop the possible market for house heating in the Taunton area. The merger will also, through interconnection of existing and contemplated oil gas sets, enable the merged company to handle peak shaving and emergency loads more efficiently.

If Brockton were to purchase the assets of the Taunton Company at their net book value, it would be required to pay $1,326,165 for the gas utility operating plant alone, as well as to assume $850,000 in debt. In order to raise funds with which to purchase this property, it would be required to sell new securities on the open market. This would entail registration of the new securities under the Securities Exchange Act, which involves a substantial and, in this case, inordinate expense of probably not less than $100,000. It would also involve the Taunton stockholders in grave tax problems, though we have little interest in the matter from that standpoint.

The Department is of the opinion that the merger of Taunton Gas Light Company with Brockton Gas Light Company, under the terms of the agreement as filed, is consistent with the public interest.

Accordingly, after notice, public hearing, investigation, and consideration, the Department hereby

Determines: That the merger of the Taunton Gas Light Company with the Brockton Gas Light Company and the terms thereof as set forth in the merger agreement filed with the petition are consistent with the public interest, and the Department hereby

Votes: That the issuance by Brockton Gas Light Company of 20,356 shares of preferred stock having a par value of $50 per share, at an issue price at par as fixed by the directors, is reasonably necessary for the purpose for which said issue of stock has been authorized and that the issue by Brockton Gas Light Company of $595,000 face amount of 3½ per cent notes due August 1, 1959, is reasonably necessary for the purpose for which said issue of notes has been authorized; and it is

Ordered: That the department hereby approves and authorizes the issue by Brockton Gas Light Company, in conformity with all the provisions of law relating thereto at an issue price at par of $50 per share, as fixed by the directors, of 20,356 shares of cumulative preferred stock at a dividend rate of $3.80 per share with liquidating value, call price, and voting rights as provided under the terms of agreement as filed with the Department. The said shares are to be issued for the purpose of acquiring all of the capital stock of the Taunton Gas Light Company under the terms as set forth in said merger agreement, and to no other purpose; and it is

Further Ordered: That the Department hereby approves and authorizes the issue by Brockton Gas Light Company of $595,000 principal amount of notes bearing interest at a rate not exceeding 3½ per cent per annum, said notes to be dated August 1, 1951, and to mature not later than August 1, 1959, to be payable as to principal at the rate of $35,000 on August 1st of each year, starting August 1, 1953, and the remaining balance of the principal to be paid August 1, 1959, said notes to be issued for the purpose of

refunding a like amount of notes of the Taunton Gas Light Company maturing August 1, 1957, and to no other purpose; and it is

Further Ordered: That upon the effective date of the merger the Brockton Gas Light Company file with the Department a stipulation that the surplus account of the Taunton Gas Light Company in the amount stated on the effective date of the merger, but not less than $643,858.89, shall thereafter be carried in Account 324, Surplus Invested in Plant, until further notice or order of the Department.

KENTUCKY PUBLIC SERVICE COMMISSION

Taylor County Rural Electric Cooperative Corporation

v.

Kentucky Utilities Company

Case No. 2268
May 7, 1952

COMPLAINT *by co-operative against electric company's extension of service into its territory; dismissed.*

Monopoly and competition, § 54.1 — Co-operative and electric company.

1. The primary question before the Commission, in determining a complaint by a co-operative against invasion of its territory by an electric company, is what public convenience and necessity require and how the public interest will best be served, p. 15.

Monopoly and competition, § 54.1 — Electric company and co-operative — Industrial customer.

2. The fact that an industrial customer is located beyond city limits is not a controlling factor in determining a co-operative's complaint against a service extension by an electric company which desires to continue to serve an industrial customer which has moved its plant a short distance outside city limits, p. 16.

Monopoly and competition, § 54.1 — Electric company and co-operative — Service to rural community.

3. A private electric utility should be allowed to extend its service in order to serve an industrial customer which has moved its plant beyond city limits, even though such extension would be into territory in which an electric co-operative is operating, since co-operatives are not organized primarily to compete with utility companies for industrial loads, p. 16.

Monopoly and competition, § 47 — Electric company and co-operative — Duplication of facilities.

4. No duplication of facilities results when an electric company extends its line to serve an industrial customer located beyond city limits where the co-operative serving the territory does not have facilities adequate to meet the anticipated needs of the customer, p. 18.

Monopoly and competition, § 54.1 — Electric company and co-operative.

5. One of the factors considered in denying a co-operative's complaint against service by an electric company to an industrial customer outside city limits was the fact that if the co-operative served the industry, its ability to serve other nonmembers would be substantially exhausted, p. 18.

Co-operatives — Purpose — Service to industries.

Statement that even though the primary purpose of an electric co-operative is to serve rural and farming interests, such purpose does not preclude service to industrial or commercial customers, p. 16.

Monopoly and competition, § 54.1 — Electric company and co-operative.

Statement that it would be manifestly inequitable for the Commission to require private utility company to sell power to a co-operative at a preferential rate and then permit the co-operative to compete with the company when the company is operating in the immediate vicinity of a proposed customer, p. 16.

By the COMMISSION:

[1] This is a complaint by the Taylor County Rural Electric Cooperative Corporation (hereinafter referred to as the "co-operative") against the Kentucky Utilities Company for allegedly extending its service into territory served by the co-op. The facts are these: The Union Underwear Company (hereinafter referred to as "Union Company") has for a number of years operated a manufacturing plant in the city of Campbellsville, Kentucky. Because of increased operation, as well as various other factors, the Union Company decided to move its operation from its present site within the city to a new building to be constructed just beyond the city limits of Campbellsville. While the Union Company was operating in the city it purchased its electric power from Kentucky Utilities. After deciding to move the location of its plant the Union Company deliberated between producing its own power and purchased power and finally, on April 19, 1951, it entered into a contract with Kentucky Utilities to supply power at its new location. Subsequent to the execution of the aforementioned contract Kentucky Utilities started the construction of an extension of its line to a point on the Union Company's plant site, a distance of some 1,200 feet from the city limits. The co-op filed its complaint against Kentucky Utilities on May 15, 1951, to determine who was entitled to serve the Union Company. The primary question before this Commission is what does the public convenience and necessity require and how will public interests best be served.

If the co-op is to be permitted to serve Union an examination of the Rural Electric Cooperative Corporation Act, KRS 279, is fundamental.

KRS 279.020(2) sets forth the purpose for which a co-operative may incorporate. It reads in part as follows:

"To promote and encourage the fullest possible use of electric energy in this state by making electric energy available to persons in rural areas of the state at the lowest cost consistent with sound business methods and prudent management . . . ."

Of equal importance is the Federal Act which created the REA and provided the funds which enabled the co-ops to construct and operate their facilities. The pertinent provision of the Federal Act in 49 Stat 1363, 7 USCA § 902, reads in part as follows:

"The Administrator is authorized and empowered to make loans in the several states and territories of the United States for rural electrification and the furnishing of electric energy to persons in rural areas who are not receiving central station service, as hereinafter provided; . . . ."

Even the allocation of the funds among the states was to be made on the basis of the number of *farms* not then electrified, 94 Stat 1364(c), 7 USCA § 903(c). From the above-quoted provisions of applicable statutes it will be seen that the purpose of the enabling acts was to extend electric service to farms and other rural areas when service by private utilities was not available. The Commission has recognized the purpose of this legislation and has co-operated to the fullest extent to make electric service available to even the remotest areas of the state. An example of this is Administrative Order No. 22 where the Commission ordered the private utilities in the state to make electric power available to the co-operatives at a special preferential rate. This they are continuing to do.

[2] Even though the primary purpose of the co-operative is to serve rural and farming interests this does not preclude their service to industrial or commercial customers. In this case, however, an industrial customer is located within 1,200 feet of the city limits where a private utility is rendering service and that utility has extended its lines to the property of the Union Company and now stands ready, willing, and able to provide the desired service. The fact that the Union Company is located beyond the city limits is certainly not a controlling factor. It is common practice for industries to select locations beyond corporate limits in order to take advantage of lower taxes and additional room for expansion if the need arises. The interests and activities of Union, and indeed their location, are—without question—urban in character.

[3] We do not think it was the purpose of either the Congress or the general assembly of Kentucky to permit co-operatives with their favorable interest rates and tax advantages, to compete with private utilities under these circumstances. In this case the the sole source of power of the co-op is the Kentucky Utilities Company. It would be manifestly inequitable for this Commission to require the private utilities to sell power to the co-operatives at a preferential rate and then permit the co-operative to compete with the utility which provides its source of power, when the utility is operating in the immediate vicinity of the proposed customer.

The question presented here is not a novel one. The same problem arose

very recently in Wyoming. In Re Rawlins Electric Co. (Wyo 1951) 91 PUR NS 1, the Commission was faced with the request of a co-operative and a private utility for a certificate to serve the same territory. In deciding in favor of the private company the Commission said: ". . . In our opinion, a private electric utility should be allowed to extend its service into rural communities whenever it is economically feasible for it to do so, provided the public therein can be furnished with adequate service at reasonable rates. Such extensions conserve public funds for allocation by the Rural Electrification Administration to co-operative electric utilities for their use in providing adequate electric service for persons in rural areas who cannot obtain same from private utilities at reasonable rates." (91 PUR NS at p. 7.)

The problem was before the neighboring Indiana Commission in Re Indiana Service Corp. (Ind 1943) 48 PUR NS 185. In this case the Indiana Service Corporation sought a certificate to serve an Army Air Field that had been built in territory served by the Allen-Wells County Rural Electric Membership Corporation. When Indiana applied for a certificate to build the line the co-operative protested. The Commission overruled this protest and granted the certificate. In ruling as they did the Commission said in part:

"Such protest is apparently based upon the idea that Allen-Wells R.E. M.C. not only has a right to enter into the business of serving large power loads, which become available under the war expansion activities of government and industry, but also that service of such loads should not be permitted from any other source. In our opinion such position is unsound, and we desire to sound a warning note. We do not believe that the rendering of service of the character sought to be supplied by petitioner in this cause, or the incurring of financial obligations and risks necessarily attendant thereon, are within the scope of the activities contemplated by the R.E.M.C. Act for co-operative organizations created thereunder. The plain purpose of the act is to make electric energy available on a co-operative basis to the inhabitants of those rural areas of the state where electric distribution systems are not available from municipal or public utilities. Numerous provisions of the act, as, for example, provisions as to membership found in § 8 (Burns' 55–4408) (and those as to additional construction found in § 18) (Burns' 55–4418) make it plain that the intended activities for corporations created thereunder were not those of undertaking the risks of the heavy investment and obligations of providing electric energy for large and too often greatly fluctuating loads of industrial or other large power users, either private or governmental. Rather the purpose of the act was to provide on a co-operative basis electric service for the farmers and related community business interests in territory which had no electric service available. In providing such service, those co-operative organizations have done and are doing a splendid job. But it seems clear to us that the engaging by rural co-operatives in the business of providing the expensive facilities and the assurance of an adequate supply of the large amounts of

electric energy that are and will be required by wartime activities of industrial plants, of huge government camps, air fields, depots, etc., would in general mean an overextension and assumption of risks not compatible with their base loads." (48 PUR NS at p. 188.)

To the same effect in Re Farr (Colo 1946) 65 PUR NS 70 when a similar problem was presented.

It seems apparent from the abovecited cases and statutes that RECC's were not organized to compete with private utilities for industrial loads. Rather their activities are complementary to the program of the private utilities in that they are given advantages which will permit them to serve areas where it is not economically feasible for private utilities to extend their lines.

[4] There are other factors which should be taken into consideration in determining the question of what public convenience and necessity require. The record indicates that both the co-op and Kentucky Utilities will have to enlarge the capacity of their existing lines from a point near their respective substations. The Kentucky Utilities substation is 1.63 circuit miles from the Union plant site. The co-op substation is 2.2 circuit miles from the Union. In addition to enlarging the capacity of existing lines the record also shows that substantial modifications and additions will have to be made to the co-op substation. Its present capacity is 1,500 kilovolt amperes. If they were to serve the Union load and continue to meet the demands of their existing customers an additional 500 kilovolt amperes of capacity would have to be added.

Since the record shows that the co-op facilities are not adequate to meet the anticipated needs of the Union plant there is no force to the contention that Kentucky Utilities would be building duplicate facilities. This conclusion is further supported by the fact that the co-op is rendering residential service in this area and the needs of Union Company represents a different type of load calling for entirely different facilities.

[5] The studies made of the proposed load of the Union plant show that it would require 600 kilowatts demand with an anticipated use of 220,000 kilowatt hours per month. For the 4-month period from January through April, 1951, the entire co-op system had an average monthly demand of 2,359 kilowatts and a per month average use of 721,000 kilowatt hours. To add this substantial industrial load to the system would result in considerable risk since one-fourth of their entire demand and nearly one-third of their total system uses would be required by this one customer. Should the system be adjusted to carry such a load and then for any reason Union were to shut down, the effect on the co-op system and the individual subscriber would be very detrimental. Providing power to the Union Company would further restrict the co-op since they are forbidden by statute from doing more than 25 per cent of their total business with nonmembers (KRS 279.120)(2). Union Company is not a member and therefore service to them by the co-operative would substantially exhaust its ability to serve other nonmembers whose needs would be more in harmony with the scope and purpose of the

Rural Electric Program. Here, then, is a private utility that has entered into a contract to provide service to an industrial customer and now stands ready, willing, and able to provide the desired service. The co-op, because it is providing residential service in adjoining territory, also seeks to serve. From the foregoing presentation we think it clear that public convenience and necessity require Kentucky Utilities to render the service.

For the foregoing reasons the Commission is of the opinion and so finds:

(1) That it is not the intent of KRS 279, the Rural Electric Co-operative Corporation Act, and 49 Stat 1363, the Federal Rural Electrification Act, that RECC's should be organized to compete for industrial power loads when a private utility is in the immediate vicinity and is ready, willing, and able to provide the desired service.

(2) That public convenience and necessity requires that Kentucky Utilities fulfil its contract with the Union Company and render the desired service.

(3) That the construction of facilities by Kentucky Utilities to serve the company does not constitute a duplication of facilities already constructed by the co-op.

It is therefore *ordered:*

(1) That Kentucky Utilities Company be, and hereby is, authorized to provide electric power to the Union Company and the complaint be, and it is hereby, dismissed.

MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES

Re Worcester Street Railway Company

D.P.U. 9836
April 7, 1952

INVESTIGATION *as to propriety of rates and charges filed by a transit company; new fares approved.*

Return, § 28 — Transit — Stock marketability.

1. Transit fares were found to be inadequate where the company's earnings were below the 13.6 per cent average yield upon which most sales of transit company securities are based and where it did not appear that the company, with its present earnings, could sell additional stock at par, p. 21.

Return, § 108.1 — Transit company operating ratio.

2. A transit company's operating ratio of 99.5 per cent, or 97.5 per cent if amortization credit were ignored, was not considered a safe margin between revenues and expenses, p. 22.

Return, § 108.1 — Transit company operating ratio.

3. New rates for a transit company which would provide the company with an operating ratio, after taxes, of about 97.4 per cent were considered fair

and reasonable in that they would not provide revenues more than adequate to keep the company in good operating condition, p. 22.

Return, § 28 — Transit companies — Marketability of stock.

Statement, in opinion on proper return allowance for a transit company, that securities of transit companies cannot be marketed on the same basis as those of other utilities, p. 22.

APPEARANCES: James A. Crotty and James A. Crotty, Jr., for Worcester Street Railway Company.

By the DEPARTMENT: Worcester Street Railway Company filed on December 13, 1951, its M.D.P.U. No. 62 containing new schedules of rates and charges covering all of its lines, stated therein to be effective January 13, 1952. The application of the proposed tariff was suspended by order of the Department and an investigation ordered as to the propriety thereof. A public hearing in connection therewith was held in Worcester on January 7, 1952, which was continued and closed in Boston on February 7th. Due notice of the proposed changes was posted in the respondent's busses and terminals.

From 1921 to 1949, respondent operated under a flat 10-cent fare. Effective March 20, 1949, it was permitted to establish a neutral central zone and to charge 5 cents for transfers out of this zone, which was estimated to produce additional gross revenues of $255,000. This order was made after long and detailed study of respondent's service and operating results (D.P.U. 8308, 79 PUR NS 206). By the early part of 1950, it was evident that the rate relief afforded in 1949 was insufficient, and a complete revision of its schedules was proposed, involving basically the use of tokens at two for a quarter, in place of the basic 10-cent fare theretofore in effect. Again, a thorough investigation of respondent's fares and service was undertaken, resulting in an order permitting its proposals to take effect on August 13, 1950 (D.P.U. 8945). In the meantime, in D.P.U. 8709, D.P.U. 7672, 70 PUR NS 60, and D.P.U. 9438, the Department has investigated the service rendered by the respondent, on two of the three occasions in very great detail. Again, in D.P.U. 9560, its entire financial picture and history was reviewed on its application under the cost-of-service statute, G.L. Chap 161, §§ 115–128. It is safe to say that nowhere and at no time has any utility been so thoroughly and carefully investigated so many times in so short a period. We have had adequate legal and technical assistance, and we do not believe that respondent has any operating data of any kind which remain to be explored.

Respondent now proposes to do away with its tokens, establishing a 15-cent basic zone fare within the city of Worcester, while retaining the present transfer charge, and to increase its suburban fares by 20 per cent. These changes are estimated to produce $311,363 in additional revenue for the full year 1952. Since three months of this year have already elapsed, it is apparent that the results for the entire year will not be so favorable as this.

During the year 1951, on the basis of eleven months' actual and one month estimated, respondent states that it was carrying 25,753,980 passengers for a total gross income of $3,203,291, or at an average fare of 12.44 cents. The actual patronage for the year was 25,817,428. Since 1946, which was its peak year, it has seen its patronage decline from over 42,000,000 passengers to the present level, a diminution of 39 per cent. It is now carrying about 119 per cent of its prewar (1936–1940) passengers. It carried 33,235,083 passengers in 1949 and 29,520,004 in 1950. Its percentage decrease in 1950 over 1949 was 11.18 per cent, and in 1951 over 1950, 12.61 per cent. This rate of decline is somewhat more rapid than the national average for comparable cities, though its curve in this respect takes the same general form as that of such other companies.

For the nine months' period ending September 30, 1951, it showed a loss of $12,500, as compared with a loss for the same period in 1950 of $107,927. This diminution of loss was, of course, in large measure due to the rate increase hereinbefore described, together with a decrease of $104,275 in operating expenses. For the entire year 1951, after year-end adjustments, respondent showed a loss of $12,229. This, however, was after charging the amount of $70,000 for amortization of abandoned facilities. If this is deducted, such operations would show a profit of $57,771 for the year before taxes. It paid dividends aggregating $37,221 on its common stock in 1951, making a total of $288,029 distributed in this manner since the organization of the company in 1932.

For the year 1952, respondent estimates that it will suffer a further loss of 10 per cent in riders. There is no reason to suppose that this result will not, in fact, follow. Its traffic for January, 1952, showed an actual decrease of 10.51 per cent. The most it can hope to accomplish in reducing expenses by curtailing service to offset this decreased patronage is about 6 per cent. From these figures, and applying increased tax and other expenses, respondent estimates that its operations in 1952, if no relief is given in these proceedings, would result in a loss of $53,391. If we grant this application, it will realize a net profit for the year of $99,108 before interest but after taxes. Since the amortization payments are fully taxable, respondent would show a net for 1952 of $169,108, if such expense is not considered.

[1] Respondent's balance sheet as of November 30, 1951, lists net carrier operating property at $1,956,775. If this figure alone is used as a rate base, the return indicated would represent about 5.06 per cent. The resultant earnings of $89,508 available for dividends on common stock would indicate a return of about 4.14 per cent on these funds. If we use as a basis the capital investment determined in our order in D.P.U. 9560 of $1,487,000, a net profit of $89,508 would represent a return of approximately 6 per cent. If we are to apply the rules laid down in the Hope Natural Gas Case (1944) 320 US 591, 88 L ed 333, 51 PUR NS 193, 64 S Ct 281, requiring us to provide a return upon outstanding equity securities adequate to attract new capital, these earnings would apparently be no more than

sufficient. It is clear that securities of transit companies cannot be marketed on the same basis as are other utility securities. Bus company common stocks commonly sell to yield over 9 per cent, and at prices to show average earnings of 13.6 per cent. The earnings we have indicated do not approach these figures, and we are convinced that respondent could not sell additional stock at par or anywhere near par with such earnings.

[2, 3] Respondent's statement, before year-end adjustments, for the year 1951 showed it to be operating at a ratio before income taxes of 99.5 per cent. If the amortization credit is ignored, this figure would be about 97.5 per cent. Neither of these ratios, in our opinion, represents a safe margin between revenues and expenses. The estimated results for 1952 on present fares show a ratio, as we have indicated, of over 100 per cent. On the basis of the increased fares requested in these proceedings, respondent's operating ratio before taxes would be about 92.2 per cent. After taxes, it would be about 97.4 per cent. If the amortization expense is ignored in this computation, the result would be a ratio of 90.4 per cent before income taxes and 95.3 per cent after such taxes. We cannot find that such operating ratios as are indicated as resulting from the rates sought to be charged in the present proceedings are unreasonably low or that they are more than adequate to keep respondent in good operating condition.

For the foregoing reasons, after due notice, public hearing, investigation, and consideration, it is hereby

Ordered: That M.D.P.U. No. 62 filed by Worcester Street Railway Company on December 13, 1951, to become effective January 13, 1952, be approved and permitted to become effective at 12.01 A.M., April 20, 1952; and it is *further*

Ordered: That the investigation in D.P.U. 9836 be and the same hereby is terminated and closed.

Re Edward O. Boshell

Docket No. ID-1107
April 29, 1952

APPLICATION *pursuant to § 305(b) of the Federal Power Act seeking authorization to hold interlocking positions; granted.*

Intercorporate relations, § 13.1 — Interlocking positions — Electric and manufacturing companies.

Authorization was granted, pursuant to § 305(b) of the Federal Power Act, 16 USCA § 825d(b), to a person holding the position of director and chairman of the executive committee of a power company to hold also the position of director in a manufacturing company which was a large supplier of electrical equipment to the power company where he was presently an officer of a holding company in the process of dissolution and in a position to dominate the power company board regardless of the action on the instant application, while in the case of the manufacturing company he would be but one of fourteen directors of recognized independence, substance, and standing in the financial and industrial community.

(BUCHANAN, Chairman, dissents.)

By the COMMISSION: On November 30, 1948, Edward O. Boshell, 15 Broad street, New York 5, New York, by order of this Commission was authorized to hold the following positions:

Director Chairman of the Executive and Finance Committee	Duquesne Light Company
Director	Louisville Gas and Electric Company (Ky.)

From information filed by Louisville Gas and Electric Company (Ky.) it appears that since May 9, 1950, applicant no longer holds position of director of said company.

On February 1, 1952, applicant filed a supplemental application pursuant to § 305(b) of the Federal Power Act, 16 USCA § 825d(b), for authority to hold the following positions:

Director Chairman of the Executive Committee	Duquesne Light Company
Director	Westinghouse Electric Corporation

The Commission having considered said supplemental application, upon the information therein contained, and other information in relation thereto furnished by the applicant, finds:

Applicant has made due showing in the form and manner prescribed by this Commission that neither public nor private interests will be adversely

affected by his holding the following positions pending further order of the Commission in regard thereto:

Director Chairman of the Executive Committee	Duquesne Light Company
Director	Westinghouse Electric Corporation

We recognize the historical fact that Duquesne has for many years made large purchases from Westinghouse, for manifestly sound business reasons and without Mr. Boshell or any other member of Duquesne's board being a member of the board of Westinghouse. There is no reason to suppose that this policy will be departed from, so long as good business judgment dictates its continuance, whether or not the applicant here is given the authority sought and granted by this order.

As a practical matter, furthermore, Mr. Boshell is now director and chairman of the executive and finance committee of Duquesne by virtue of his relationship to Standard Gas and Electric, a holding company solely within the jurisdiction of the Securities and Exchange Commission and presently in the process of dissolution under the aegis of that Commission. As such he is admittedly in a position to dominate the Duquesne board, either directly or through nominations, and will continue in that position, regardless of our action herein, at least until the process of dissolution under Securities and Exchange Commission supervision has been concluded. In the case of Westinghouse, however, he will be but one of fourteen directors of recognized independence, substance, and standing in the financial and industrial community.

It is for these reasons that we fail to find any scintilla of reason for supposing that either public or private interests will be affected in any way—either adversely or otherwise—by granting him the authority here sought. Should any such possibility develop, however, the retention by the Commission of continuing control through the condition inserted in the order would afford a basis for ample protection to the public interest through withdrawal of the authorization herein granted.

The Commission has reviewed facts developed in the record of the Aldred Case.[1] In that instance, Aldred was the moving spirit in the formation and the dominating influence in the management of the so-called "Baltimore System," consisting of Consolidated Gas Electric Light and Power Company of Baltimore, Pennsylvania Water and Power Company, and Safe Harbor Water Power Corporation. He also held the controlling interest in the firm of Aldred & Company, an investment banking partnership which for some twenty years had served as fiscal agent for those companies. This association had resulted in alliances and transactions closely bordering upon a violation of fiduciary relationships. We see no parallel or analogy between the circumstances of the instant case and that demonstrated violation of proper standards of business ethics.

The Commission *orders:*

(A) Until further order of the Commission, said applicant is hereby

[1] Re Aldred (1940) 2 FPC 247, 35 PUR NS 361.

authorized to hold the positions described in the above finding, subject to the provisions of Part 45 of the codification and reissuance of the Commission's Rules effective January 1, 1948, and to the specific reservation of the right of the Commission to require said applicant to make further showing that neither public nor private interest will be adversely affected by his holding said positions.

(B) All orders heretofore made authorizing applicant to hold positions pursuant to § 305 (b) of the Federal Power Act are hereby superseded.

BUCHANAN, Chairman, dissenting: This applicant, now director and chairman of the executive and finance committee of Duquesne Light Company, seeks authorization to hold an interlocking directorship in Westinghouse Electric Corporation, which is the largest supplier of electrical equipment to Duquesne Light Company. (For the year 1950 Duquesne purchases from Westinghouse totaled over $4,260,000.) The sole record before us is the application and the oral unreported statement made by the applicant to the Commission, neither of which reveals any evidence to meet the showing required by § 305 (b) of the Federal Power Act, 16 USCA § 825d(b), to wit: "That neither public nor private interests will be adversely affected thereby." On the contrary, the fact that the companies have in the past and propose to continue in the future to have large financial dealings with each other as buyer and seller places the applicant in the position where he must act on both sides of such transactions, with possible adverse effects on Duquene's rates and Westinghouse's competitors.

The Commission in the Aldred Case (1940),[1] in which it had twenty applicants before it seeking to continue to hold interlocking positions, took occasion to set out in its opinion the principles and standards which it would use to guide it in considering all applications in the future. In so doing it stated that among the practices sought to be eliminated by § 305 (b) was: "The lack of arm's-length dealings between public utilities and organizations furnishing financial services or electrical equipment, ..."

I believe that principle should be applied here. I do not believe that it is a question of the independence, substance, or standing of the applicant in the financial and industrial world that is a test in these cases. Nor do I believe that anything personally derogatory is to be inferred from any withholding of such approval in and of itself. It is the system of interlocking directorates between public utilities and electrical equipment manufacturers which provides the test before us and against which Congress has inveighed. The presumption of § 305 (b) is that such a situation is wrong and the act places the burden on the *applicant*, of showing that there will *not* be an adverse effect and does not place a burden on the *Commission* of showing that there *will be*. The burden placed on the applicant is a heavy one. The purpose of the requirement was to avoid for the future the kinds of situations from which objectionable practices had frequently arisen in the past.

[1] Re Aldred, 2 FPC 247, 35 PUR NS 361, 374.

On the basis of the record before us it is impossible for me to make the finding that neither public nor private interests will be adversely affected by the holding of these positions, a finding which Congress requires us to make before such positions are authorized. For these reasons I dissent from the action taken.

ILLINOIS COMMERCE COMMISSION

Vera Johnson

v.

Illinois Central Railroad Company

No. 39271
May 14, 1952

COMPLAINT *charging railroad with discriminatory practices on intrastate passenger trains; railroad ordered to cease and desist segregation on the basis of race or color.*

Discrimination, § 206.1 — Railroad passenger segregation — Car-card loading system.

1. The practice of a railroad of loading passengers on an unreserved coach train by a so-called "car-card" system, under which passengers are directed to specific trains by cards handed to them as they pass through the gate to the loading platform, was found to be discriminatory, notwithstanding the contention by the railroad that the system was merely an orderly means of loading a large number of passengers and distributing them in various sections of the train according to destination to facilitate their discharge, where it appeared that in practice the effect of the "car-card" system was to place Negro passengers in the same cars, regardless of destination, and sometimes to require them to stand in overcrowded cars and to deny them vacant seats in other cars which would have been available to them if they were white, p. 26.

Discrimination, § 206 — Service — Equal facilities.

2. Public utilities may not subject any person to prejudice or disadvantage but must furnish all persons with facilities in service without discrimination, p. 26.

By the COMMISSION:

[1, 2] On March 17, 1951, the state's Attorney of Cook county, on behalf of Vera Johnson (complainant), filed a verified complaint with the Commission charging the Illinois Central Railroad Company (respondent) with discriminatory practices on

one of its trains carrying passengers in intrastate service in Illinois and interstate service between points in Illinois and other states. Pursuant to leave of the Commission complainant filed an amended complaint on June 15, 1951.

Complainant alleges that she is a member of the Negro race; that, on July 1, 1950, complainant bought a ticket at the respondent's Central station in Chicago which entitled her to transportation service in a coach car on certain trains operated by respondent, including a train sometimes called the "City of New Orleans," which carries passengers in both intrastate service in Illinois and in interstate service between points in Illinois and in other states; and that as she went through the gate of the station to the loading platform, she was handed a card by an employee of respondent, on which was printed "Car 2 City of New Orleans." Complainant further alleges that said Car No. 2 was a coach located at the front end of the train a long distance from the point where she entered the passenger loading platform and was a car provided for the exclusive use of Negro passengers on a segregated basis; that between the point where complainant entered the passenger platform and Car No. 2 were a number of coaches containing many empty seats; that she was carrying her luggage which was very heavy; that she was denied permission by the employees of respondent from entering any coach other than Car No. 2; that every seat in Car No. 2 was occupied at the time she reached it but she was nevertheless denied permission and physically prevented from riding in another coach containing empty seats.

Complainant further alleges that the segregation practiced by the respondent discriminated against complainant; that said discrimination and segregation were entirely because of her race and color; and that such discrimination and segregation violated Federal and state laws. The complaint prays that the Commission enter "such order or orders as may be found necessary to enforce all laws and statutory provisions made for the administration of common carriers in the state of Illinois," and that the complainant be given whatever other relief may be proper.

On July 5, 1951, the Commission granted a petition to intervene filed by the Chicago branch of the National Association for the Advancement of Colored People. Evidence was taken at eight hearings conducted by a duly authorized examiner of the Commission on various dates from June 29, 1951, to February 13, 1952. The Commission heard oral argument on April 15, 1952, the date suggested and agreed to by the parties.

During the course of the hearings respondent moved to dismiss the proceedings for want of jurisdiction on the ground that the testimony was based on an interstate operation over which the Interstate Commerce Commission has jurisdiction. At the request of counsel for respondent this motion was taken under advisement.

The discrimination alleged in the complaint arises from respondent's application of its so-called "car-card" system in loading passengers on the "City of New Orleans," an all-coach train having no reserved seats, at re-

spondent's Central station in Chicago, Illinois, the northern terminus of the train. Under this practice passengers are assigned to specific cars by handing to each passenger a card designating a particular car as he passes through the gate to the loading platform.

Respondent contends that the car-card system is aimed solely at the orderly and safe loading of the large number of passengers and that the assignment of Negro passengers to coaches reserved for colored persons only is based on its study of the preferences of its passengers; that none of these assignments is compulsory and that, after loading, all passengers are free to move to vacant seats in other cars if they choose to do so.

Illinois Central's assistant general passenger agent, Mr. E. L. Holmes, testified that the loading of the City of New Orleans was "supervised" because it is a nonreserved, heavily loaded train; that the purpose of the car-card system is to assure courteous handling and proper location of long- and short-haul passengers, and to "follow the desires of passengers as expressed to the Illinois Central"; and that intrastate passengers under this system are loaded in the center of the train. He further testified that the cards do not assign seats . . . "they are merely a suggestion as to where they will find accomodations." He also stated that the Illinois Central attempted to seat racial groups together, but that it issued specific instructions that all members of the public are to be afforded equal rights to walk through the train and use all facilities on trains regardless of color.

Other witnesses for Illinois Central testified that, although colored persons may be "directed" to cars at the front end of the train and white persons "directed" to cars at the rear end, employees are not instructed by the Illinois Central management to enforce a policy of segregation in any manner whatsoever. They also testified with respect to alleged instructions of the railroad's management that all passengers be treated alike regardless of race, creed, or color. Certain of these instructions purportedly are written. None was introduced in evidence. Several witnesses, including C. J. Fitzpatrick, general manager of the northern lines of Illinois Central, testified that the loading of colored and white passengers at different ends of the City of New Orleans is dictated by the railroad's experience that its passengers desired this division of color. Admittedly, the railroad has no letters or other written documents in its files to substantiate this experience. The general superintendent of dining service testified that he instructed dining car employees to seat passengers on a first-come, first-served basis, regardless of color. The record shows that the City of New Orleans carries a dining car and a lunch-counter lounge; that the diner is placed near the rear of the train, and the lunch-counter lounge is located near the front; and that not all of the food and services available in the diner are available in the lunch-counter lounge.

The general manager of the northern lines of Illinois Central also testified that an orderly loading procedure does not require a system based on color lines; the important thing is to separate passengers according to destination.

The record shows that on July 1, 1950, complainant boarded the City of New Orleans at Illinois Central's Central station; that as she passed through the gate at the loading platform, her ticket for transportation to Canton, Mississippi, was punched and she was handed a card marked "Car 2" which was located near the head of the train. She testified that she carried 3 pieces of luggage and as she walked down the loading platform, she passed some partially empty coaches and tried to board one but was told by the car porter that she could not get on, that these cars were for white people. She further testified that she went to Car 2 and entered it; that it was crowded and people were standing in the aisle; that she also stood in the aisle until the train started to move and then began walking back through the train looking for a seat; that she went through about six or seven cars occupied by colored people, all filled with people in the aisles; that she reached a coach occupied by white people in which there were 3 empty seats and sat down in one. She further testified that by the time she sat down the porter came and told her she couldn't sit there, that it was reserved for white people, and that he took her by the arm and took her and her luggage back to Car 2. She remained standing in Car 2 until it reached Kankakee, Illinois, where some people in that car got off the train and she obtained a seat, but some other people remained standing.

A colored Baptist minister testified that he traveled on the City of New Orleans the same day. He also boarded the train at the Illinois Central's Central station in Chicago, where the train was made up, and was given a card marked "Car 2" as he passed through the gate to the loading platform. He put the card in his pocket and went to Car No. 9. The conductor approached him and asked to see his number and he showed the conductor his railroad ticket. The porter attempted to prevent him from entering the car but he boarded it. The porter then took his suitcase and told him to get out, but he sat down in the car. He also testified that when he went into the observation car the conductor asked him: "How long are you going to sit here?"

Other colored witnesses testified that on other dates they traveled on the City of New Orleans from Chicago to Champaign, Illinois, to Carbondale, Illinois, and to Cairo, Illinois, and that on each of these occasions they were handed car cards assigning them to cars toward the head of the train occupied exclusively by Negroes; that after entering the cars to which they were assigned they walked toward the rear of the train through other coaches filled exclusively with Negro passengers until they found seats in white cars and were told by porters on the coaches they belonged further up in the train.

Section 38 of the Public Utilities Act (Ill Rev Stats 1951, Chap 111⅔) provides in part:

"No public utility shall, as to rates or other charges, services, facilities or in any other respect, make or grant any preference or advantage to any corporation or person or subject any corporation or person to any prejudice or disadvantage . . . Every public utility shall, upon reasonable notice, furnish to all persons who may apply

therefor, and be reasonably entitled thereto, suitable facilities and service without discrimination and without delay."

The Illinois Central contends that its policy is to treat all passengers alike, regardless of their race, and that the car-card system is used as an orderly means of loading of large numbers of passengers and distributing them in various sections of the train according to destination to facilitate their discharge at their destination. The record clearly shows, however, that in practice the car-card system operates to segregate Negro passengers boarding the train at Central station in Chicago in cars toward the head of the train solely because of their race and without regard to their destination. Negro passengers are segregated in such cars whether they are traveling to points within Illinois or to points beyond the state boundary. The record further shows that Negro passengers are sometimes required to stand in overcrowded cars and are denied vacant seats in other cars which would be available to them if they were white. Such denials of vacant seats in white cars by the application of the car-card system subjects such passengers to a disadvantage or discrimination.

Since 1885, the Illinois Civil Rights Act (Ill Rev Stats 1951, Chap 38, § 125) has provided that:

"All persons within the jurisdiction of said state of Illinois shall be entitled to the full and equal enjoyment of the accommodation, advantages, facilities, and privileges of inns, restaurants, eating houses, hotels, soda fountains, soft drink parlors, taverns, roadhouses, barber shops, department stores, clothing stores, hat stores, shoe stores, bath rooms, rest rooms, theaters, skating rinks, concerts, cafes, bicycle rinks, elevators, ice cream parlors or rooms, railroads, omnibuses, busses, stages, aeroplanes, street cars, boats, funeral hearses, and public conveyances on land, water or air, and all other places of public accommodations and amusement, subject only to the conditions and limitations established by laws and applicable alike to all citizens; . . ."

The provisions of § 38 of the Public Utilities Act prohibiting public utilities from subjecting any persons to any prejudice or disadvantage and requiring them to furnish all persons with facilities and service without discrimination must be construed in the light of the long-established policy of the state as expressed in the above section of the Civil Rights Act, particularly since the Civil Rights Act is made applicable to railroads by its express terms.

There is no danger of § 38 of the Public Utilities Act creating any burden on interstate commerce since the applicable Federal law (§ 3(1) of the Interstate Commerce Act, 49 USCA § 3(1)), is the same as the Illinois law.

Furthermore, the loading of passengers on the City of New Orleans at the Central station of the Illinois Central in the city of Chicago by the application of the car-card system to both intrastate and interstate passengers is a matter of local concern and subject to state regulations.

As indicated above, Illinois Central contends that the assignments of passengers by the car cards to specific cars are not compulsory and that after loading all passengers are free to move to

vacant seats in other cars if they choose to do so. In the words of witness Holmes, the cards "are merely a suggestion as to where they will find accommodation." This system is, at the least, misleading to both the passengers and to the crew. There is nothing on the cards given the passengers to indicate that they are merely suggestions and not assignments of space. Conductors of trains carrying passengers within the jurisdiction of this state are vested with police powers while on duty by "An act for the protection of passengers on railroads and steamboats," enacted by the general assembly in 1877. It is reasonable for passengers to assume that directions given them under the apparent authority of the conductor are required to be obeyed. The maintenance of proper order on trains necessary for the safety of passengers requires that such orders be obeyed. The giving of directions to passengers on trains by those in apparent authority subject to other instructions by the railroad that they cannot or should not be enforced is an unsound practice and cannot be approved.

The Commission having considered the evidence in the record and the arguments and briefs of counsel, and being fully advised in the premises, is of the opinion and finds:

(1) that the Commission has jurisdiction of the parties to this proceeding and of the subject matter involved herein;

(2) that the recitals of fact hereinabove set forth are supported by evidence in the record and are hereby adopted as findings of fact;

(3) that the Illinois Central Railroad Company (respondent herein) is engaged in the transportation of persons as a common carrier in the state of Illinois and is a public utility as defined in § 10.3 of the Public Utilities Act;

(4) that the Illinois Central operates an all-coach, nonreserved train known as the "City of New Orleans" which runs daily in both directions between Chicago, Illinois, and New Orleans, Louisiana, and has its northern terminus at the Central station of the Illinois Central in Chicago, Illinois;

(5) that each passenger, as he passes through the gate at the Central station to the loading platform to board the City of New Orleans, is handed a card designating a particular car to which such passenger is assigned;

(6) that the alleged purpose of this car-card system is to provide for the orderly loading of cars and the distribution of passengers according to their destination;

(7) that said car-card system is applied in a manner to segregate Negro passengers in cars toward the head of the train without respect to their destination and without respect as to whether they are traveling to points within the state of Illinois or beyond the border of the state of Illinois;

(8) that the application of said car-card system sometimes requires Negro passengers to stand in overcrowded cars when there are vacant seats available in other cars which would be available to them if they were white;

(9) that the application of said car-card system resulting in the assignment of Negro passengers to cars reserved for Negro passengers toward the head of the train makes it more

difficult for Negro passengers, as compared with white passengers, to use certain facilities such as the observation car and the diner which are located at or near the rear end of the train;

(10) that the application of the car-card system in the manner above set forth subjects Negro passengers to prejudice and disadvantage and discrimination with respect to service solely because of the race and color and is contrary to the provisions of § 38 of the Illinois Public Utilities Act and the long-established policy of the state of Illinois as set forth in the Civil Rights Act; and

(11) that the Illinois Central should be ordered to discontinue use of the car card in a manner which segregates passengers on the basis of race or color.

It is therefore *ordered* by the Illinois Commerce Commission that the Illinois Central Railroad Company be, and it is hereby, directed to cease and desist from assigning passengers to specific cars in the state of Illinois in a manner which segregates passengers on the basis of race or color.

It is *further ordered* that respondent be, and it is hereby, prohibited from using a car-card system in assigning passengers to designated cars in the state of Illinois in a manner which segregates passengers on the basis of the race or color of such passengers.

It is *further ordered* that the Commission retain jurisdiction of the subject matter and of the parties hereto for the purpose of entering any further order or orders as it may deem meet.

It is *further ordered* that all undisposed-of motions made by any of the parties hereto be, and they are hereby, disposed of consistent with the conclusions of the Commission herein.

Industrial Progress

A digest of information on new construction by privately managed utilities; similar information relating to government owned utilities; news concerning products, supplies and services offered by manufacturers; also notices of changes in personnel.

Gas Industry Plans $5.6 Billion Expenditure in Next 5 Years

THE NATION'S gas distribution and pipeline industry will spend about $5.6 billion for construction of new facilities and expansion of plant in the five-year period extending from 1952 through 1956, the American Gas Association estimated recently. This compares with construction expenditures of $5.1 billion over the past five years, a previous high record in the gas industry.

The natural gas branch of the industry expects to spend $5,099,000,000 in its five-year expansion program, compared with $4,560,000,000 spent in the 1947-1951 period. Expanded transmission facilities will cost an estimated $3,075,000,000 in the next five years, with $415,000,000 allocated to production facilities and an additional $82,000,000 estimated for underground storage expansion.

All other types of gas will account for about $500,000,000 in new construction in the next five years. Expanded distribution facilities will cost an estimated $302,000,000 and $150,000,000 will go toward production and storage facilities.

The Association reports that despite shortages of essential pipe and other materials the gas industry expended a record $1,461,500,000 in 1951 for construction of new facilities. This sum exceeds the previous peak established in 1950 by $263,200,000, or 22.0 per cent.

Indications are that there will be a temporary slackening of construction expenditures during 1952 because of continued allocation and material difficulties. However, the estimated expenditure of $1.17 billion in 1952 still represents the third greatest annual expenditure in gas industry history. A number of major pipelines were completed in 1951 and augmented capacity of the nation's pipeline system in 1952 will be accomplished to a greater extent than before, through installation of additional compressor, rather than pipe facilities.

Current plans indicate that the record established in 1951 may be broken in 1953, when estimated construction expenditures total $1,681,000,000. This estimate reflects plans for major expansions of existing systems to be started in 1953, as well as one new pipeline from the Gulf Coast area to the Middle West and the initiation of a natural gas pipeline, either from Canada or the Southwest, to serve the Pacific Northwest.

Substantial completion of such projects contributes to the sustained high level of anticipated expenditures, estimated at $1,206,000,000 in 1954. Expectations for the fourth and fifth years of the period reveal decreases, though prior estimates for the more remote years have consistently understated subsequent actual expenditures.

The actual expenditures in 1951 and projected expenditures in 1952 are based on reports submitted to AGA by companies representing over 95 per cent of total revenues of the industry. Forecasts beyond 1952 are the result of a special annual survey by the Association's

(*Continued on page 26*)

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Bureau of Statistics, among a substantial number of pipeline and large distribution companies.

Bulletin Describes Chem-Rem

A NEW product information bulletin describing Chem-Rem chemical resistant paint is announced by Speco, Inc., Cleveland.

The bulletin states that Chem-Rem is an acid and alkali-resisting paint which can be used on metal, wood or masonry surfaces, indoors or out. Applied by either brush or spray, it dries to a hard, glossy black finish.

Chem-Rem's chemical-resisting properties are listed in the new bulletin, as well as application and coverage data. Various uses for the paint are also described.

Write for Bulletin 51522 to Speco, Inc., 7308 Associate avenue, Cleveland 9, Ohio.

Burroughs Expands Marketing Program

BURROUGHS ADDING MACHINE COMPANY recently announced an expanded marketing program which will, for the first time, make its adding machines and cash registering machines available through retail stores and local dealers in all parts of the United States and Canada. Heretofore, the company sold its products only through its own sales branches. Under the new program, distribution by direct company representatives has been supplemented by releasing 15 hand and electrically operated models for sale also by dealers to be selected by the company.

Machines included in the program can be sold "over the counter," and can be applied to office problems without expert knowledge of accounting systems. All machines will carry the Burroughs guarantee, and the company's service organization will provide maintenance service on the same basis as with products sold through Burroughs branches.

Tuthill Offers Guide to Pump Applications

A NEW type of reference chart on small pump applications has just been developed by Tuthill Pump Company, Chicago.

In one convenient table this guide lists the various types of Tuthill pumps, the services for which each is built, the performance characteristics, types of packing, styles of mounting, and features that distinguish each model.

Copies of the chart are available on request to Tuthill Pump Company, 939 East 95th street, Chicago 19, Illinois.

Public Service of No. Ill. to Continue Farm Show

THE electric farm show of the Public Service Company of Northern Illinois, which has been a feature of northern Illinois county

(*Continued on page 28*)

useful items

The five Lincoln booklets on S.E.C. matters are supplied without cost. They are Federal Laws, Form S-1 (registration statement), Regulation S-X (financial statements), Regulation C (registration procedure), Regulation X-14 (proxy rules). A request on your business stationery will bring these useful items to you promptly.

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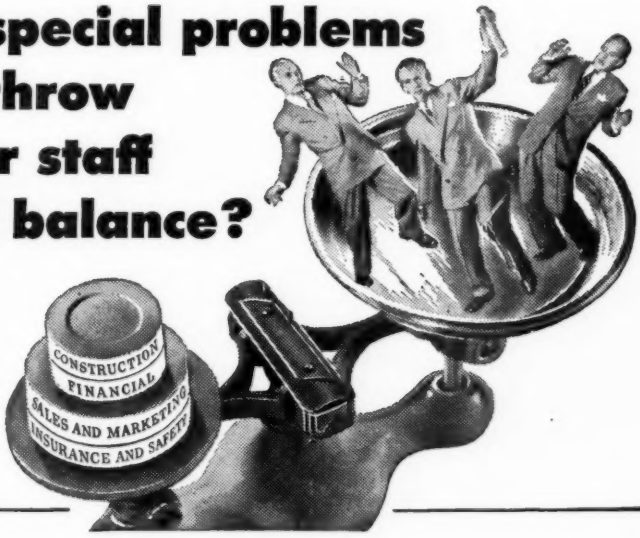

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fairs for the past five years, will be featured at eleven 1952 fairs this summer with a completely new exhibit, it was announced recently.

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EEI Offers Course in Appliance Sales Training

In an effort to assist the electric light and power companies and appliance dealers in achieving a greater degree of good salesmanship among their sales personnel, the Sales Personnel and Training Committee of Edison Electric Institute has prepared a six-lesson appliance sales training course.

Consisting of six 100-frame sound slide films, six trailer discussion films, six leaders guides and six manuals, the course describes not only basic selling principles but also shows the trainee, by use of typical selling situations, how to seek out prospects, answer objections, demonstrate and close the sale.

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The course was prepared as a result of replies to a questionnaire sent to electric utility sales executives who indicated a need for materials with which to train retail salesman for the increasingly difficult job of selling appliances. The executives agreed that the only solution to increasing consumer resistance was the return to good sound salesmanship.

The Appliance Sales Training Course is available from Edison Electric Institute for $250 for the complete package. A 10 per cent additional charge is made to non-members of EEI. Additional sets of manuals for distribution to each trainee are available for $4.50 per set of six.

Northern Natural Gas to Spend $38,000,000

Northern Natural Gas Company of Omaha, Nebraska, plans to spend more than $38,000,000 on expanding its facilities. The company plans to increase its daily delivery capacity to 825 million cubic feet from the present daily rate of 600 million. To do this the concern will expand its facilities in Texas, Oklahoma, Iowa, Kansas, Nebraska and Minnesota.

Index of Honeywell Literature

Bulletin Index 100-A is an index of technical literature available from Honeywell's Industrial Division. It consists of both a numerical listing and alphabetical cross index for specification sheets, instrumentation data sheets, catalogs and other literature. Included in the alphabetical index, are articles from "Instrumentation," the manufacturer's quarterly publication.

Copies are available from Minneapolis-Honeywell Regulator Company, Station 40, Wayne and Windrim avenues, Philadelphia 44.

PP&L Starts Construction of Martins Creek Station

At a recent ceremony formalizing start of construction of Pennsylvania Power & Light Company's big new Martins Creek power plant, members of the company's board of directors visited the 483-acre site along the Delaware River. Contracts for the concrete and plant substructures were let several weeks ago.

The big new plant, part of PP&L's $288 million postwar program, will be of the "outdoor" type, a design new to the PP&L area. Ultimately to be part of the company system network grid, and in turn tied into the Pennsylvania-New Jersey-Delaware-Maryland interconnection—it will be an important addition to the power supply facilities of the eastern Middle Atlantic States area. Plans call for completion and "in service" of this initial unit in 1954.

The Martins Creek plant will have an initial generating capacity of 132,500 kilowatts in a single unit, the largest turbine-generator so far in the PP&L system. Ultimately the generating capacity of this new plant, like the company's big new Sunbury power plant, may be many times that of the first unit.

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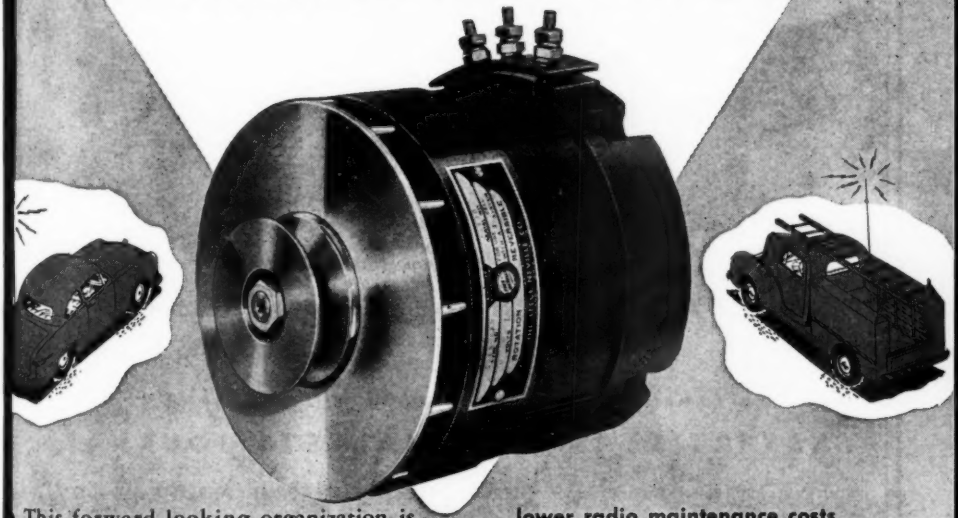

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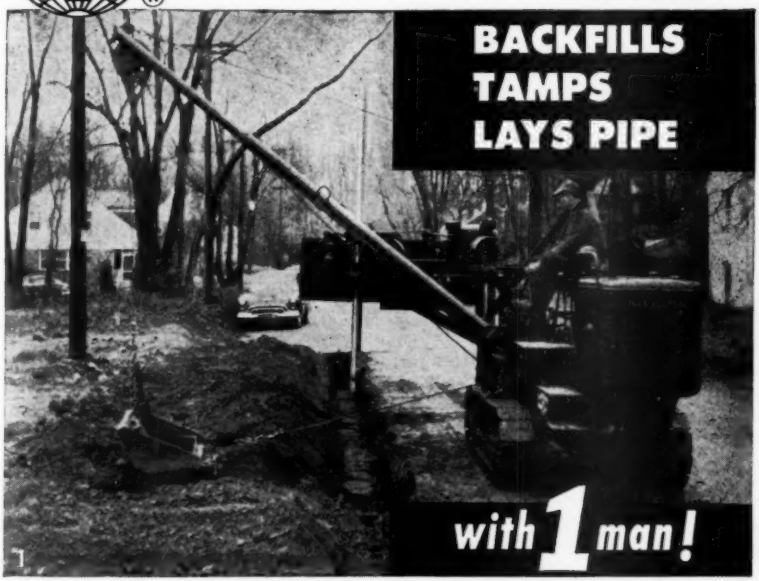

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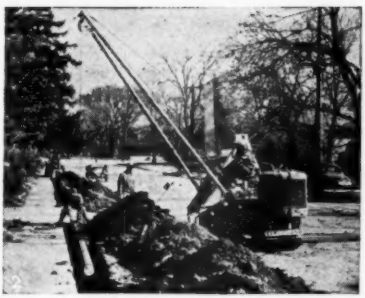

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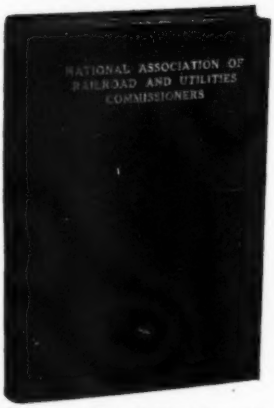

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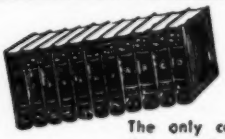

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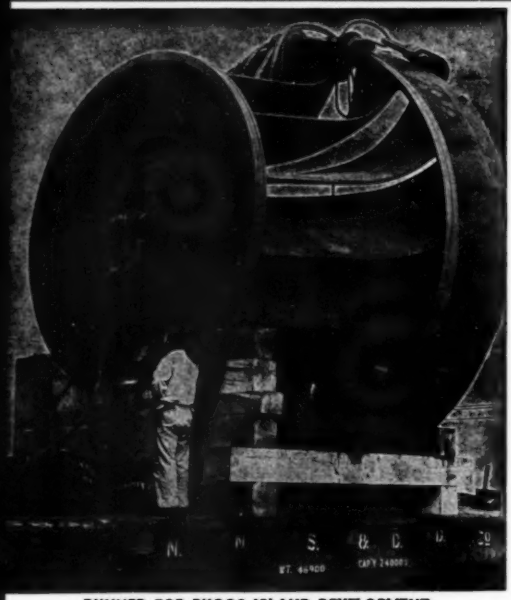

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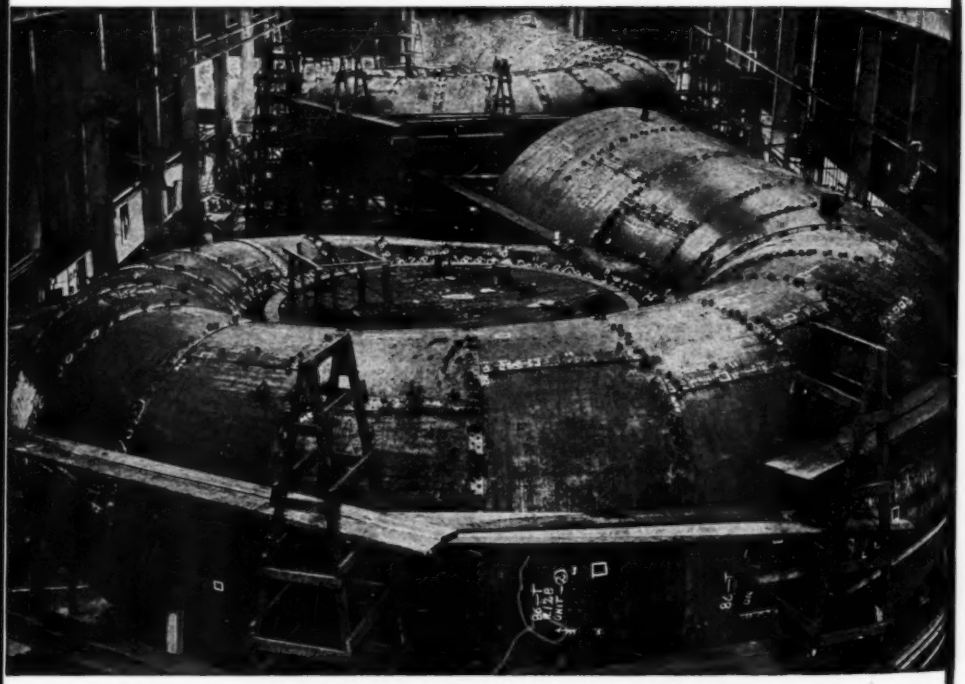

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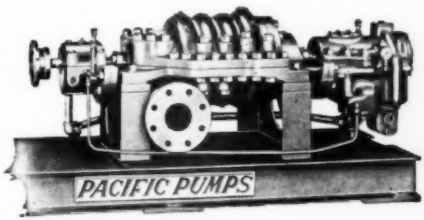

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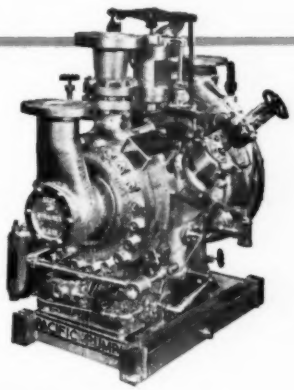

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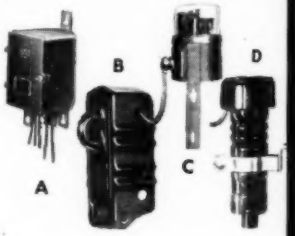
D Pellet Lightning Arrester — for protecting both primary and secondary sides of transformers.

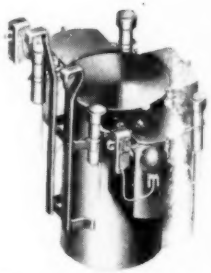
E Type E-1 Controller (not shown) — heavy-duty solenoid-operated oil switch to control transformers.



● ***Cut installation time and expense . . .***

WITH G-E "PACKAGED" REGULATORS

You reduce installation time and conserve pole space with G-E "packaged" Substation-type Constant-current Regulators (illustrated at right). Available in 15, 20, 25 and 30 kw ratings, these "packages" contain all protective and controlling elements for efficient, economical series street-lighting operation where 120-v, 60-cycle control power is available. They are factory assembled and can be put into service simply by connecting power and control leads. Each component is readily accessible for servicing.



G-E Substation-Type Re iator.

● For information on any of the above equipment, or on G-E engineering service, write *Section 452-131E, General Electric Co., Schenectady 5, New York.*

GENERAL ELECTRIC